THE REFINER AND NATURAL GASOLINE MANUFACTURER

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The Gulf Publishing Company, publishers of specialized oil journals, and the operating branch of the Refining and Natural Gasoline business, announce the birth of

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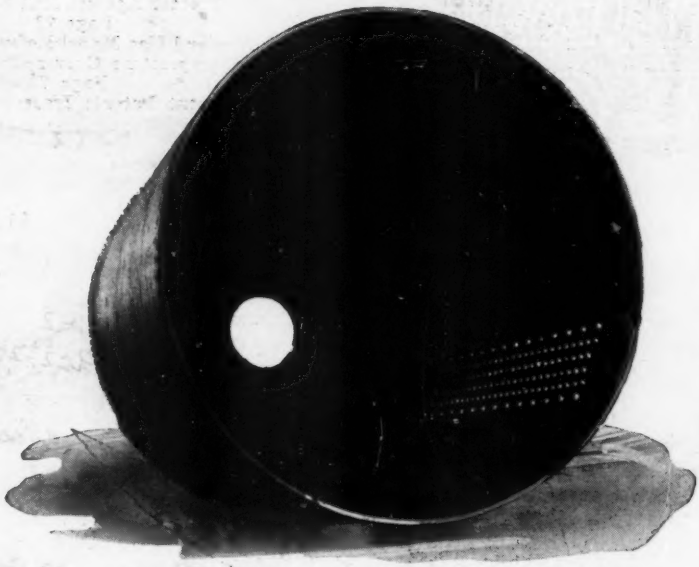

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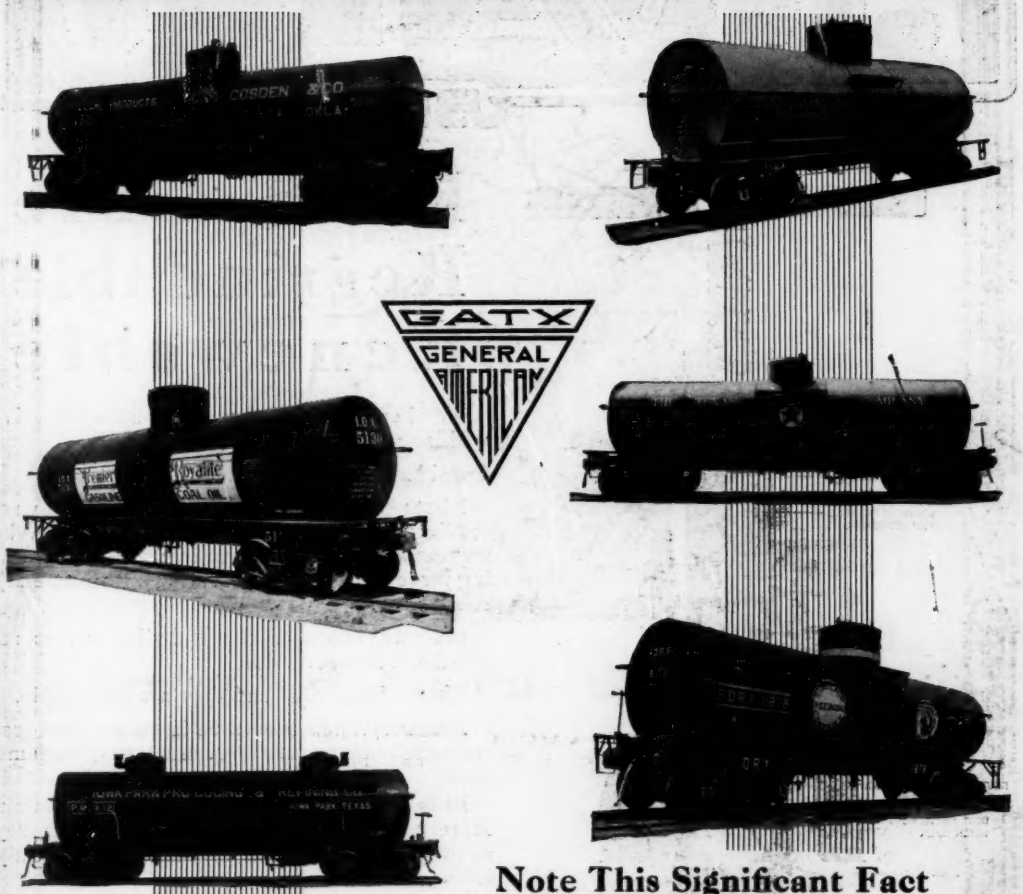

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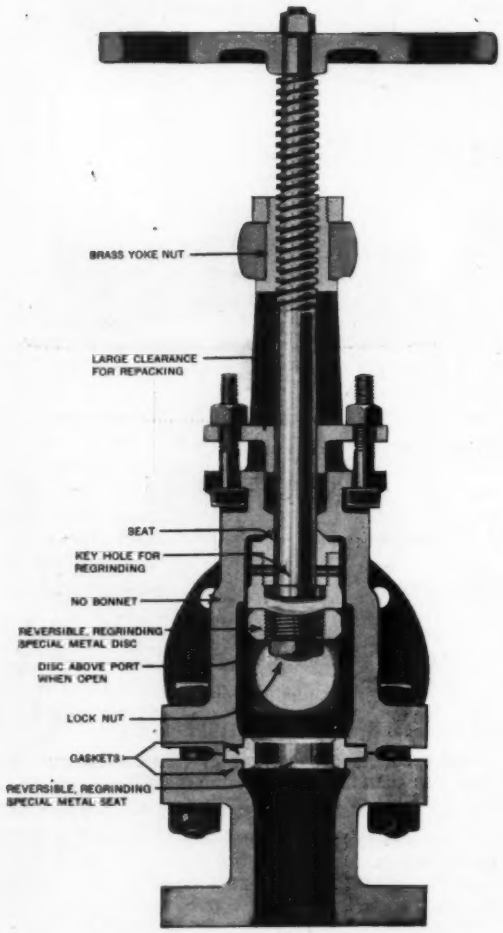

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The REFINER and NATURAL GASOLINE MANUFACTURER
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For men engaged in the operating branch of the refining and natural gasoline business.

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R. L. DUDLEY..Manager
F. N. WILLIAMS..Editor

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Advertising rates upon application to nearest office.

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Our Purpose

THE trade publication that attempts to cover a field when that field does not exist is doomed in advance; a publication that attempts to cover a field that does exist will prosper just in proportion to the earnestness of its purpose and the accuracy of its judgment.

For a long time we have believed that the refining branch of the oil industry deserved a publication devoted to its particular problems. For a long time we have believed that the natural gasoline business had grown to the point where a publication dedicated to its interests was needed.

These two branches of the industry, closely allied in more ways than one, have developed to a tremendous degree during the past decade, but the development is by no means completed. For some time we have thought that an industry that must get better and better results with the raw material at its command needed a professional journal having for its purpose the dissemination of knowledge of what is going on in that industry.

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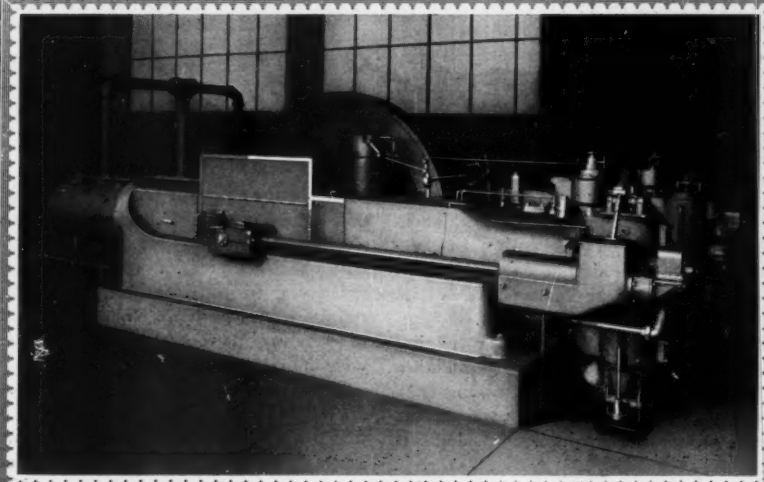

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Temperature Pressure Curves of Petroleum Products Determined

By M. B. Cooke,
Asst. Refinery Engineer, Bureau of Mines

WASHINGTON, D. C., Aug. 5.—In the course of investigation now in progress by the Bureau of Mines into the nature of "gum forming" constituents of gasoline, several gasolines and other petroleum products were heated in a small bomb, and pressures of considerable magnitude were developed. As the Bureau has received many inquiries for data showing the pressure that may be developed in a still when gasoline or other oil is subjected to elevated temperatures, it was thought advisable to record the pressures observed at various temperatures in the course of this work. These data were merely a by-product of the main investigation.

Gasoline and similar products are very complex mixtures, and it is difficult to determine accurately the true vapor pressures, hence the vapor pressures of the oils used in these tests have not been studied in detail, but the data obtained may be taken as representative of the pressure temperature relations of the various oils in commercial work.

Apparatus

The apparatus for the tests consisted of a small steel bomb designed to carry a working load of 1000 pounds per square inch with a factor of safety of 20. This bomb was constructed from a hexagonal piece of steel bar, and the outside dimensions without the cover were about 2½ by 6 inches. The lid was made in one piece from the same material, was ⅝-inch in thickness, and was threaded on the inside of the rim. The bomb proper had inside dimensions of 1½ by 5⅛ inches, and was threaded on the outside of the rim. The lid was also provided with a male rim which fitted into a groove, containing a lead gasket, machined in the top of the bomb. A pressure gauge mounted on a ¾ by 6-inch brass nipple of ⅛-inch bore was screwed into a hole in the center of the lid. The total capacity of the bomb and gage connections was 160 cubic centimeters. The bomb was heated in a bath of steam cylinder oil which was stirred thoroughly.

Test Procedure

The apparatus was tested by placing in it 100 c.c. of distilled water, closing the bomb, and heating it in the oil bath to a maximum tempereature of 200 degrees C. At intervals during the test the temperature of the oil and the pressures developed in the bomb were simultaneously recorded. These results are given in Table 1 together with data taken from the work of Marks and Davis.*

Table 1.

Comparison of Pressure Exerted by 100 c.c. Water in Bomb and Theoretical Pressures

Temperature of oil in bath		Pressure, Lbs. per sq. in. (Gage)	Pressure, Saturated Steam (Marks and Davis tables)
°C	°F		
160.0	320.0	70	73
181.0	358.0	130	133
190.0	374.0	163	167
193.0	379.0	175	179
198.0	388.0	200	202

In comparing the results actually obtained in these experiments with data taken from the tables, it will be noted that the maximum error (probably due to the presence of air in the bomb) was four pounds per square inch. It can be assumed therefore that the determinations on gasoline represent fairly closely the pressures that would be developed under theoretically perfect conditions.

Temperatures and pressures were recorded also as the bomb cooled down, and showed that the lag between the oil bath and the bomb was probably not more than 1 degree C.

Data Collected

One sample of casinghead gasoline, two of motor gasoline, one of kerosene and one of transformer oil were heated in the bomb as described above, and the resulting temperature-pressure curves for the various products are given in Fig. 1. The distillation range as determined by the standard A. S. T. M. method* is given in Fig. 2. The distillation range of transformer oil is not given because it is too high to obtain by the standard A. S. T. M. method.

It will be noted by referring to the curve in Fig. 1 that petroleum products with a low boiling point range—such as casinghead gasoline and some of the lighter motor gasolines—generate a higher pressure at a given temperature than water vapor. Petroleum products with a relatively high boiling range—such as kerosene and transformer oil—generate less pressure than water vapor at a given temperature. In general, the pressure generated by petroleum products when subjected to elevated temperatures varies inversely with the average boiling point of

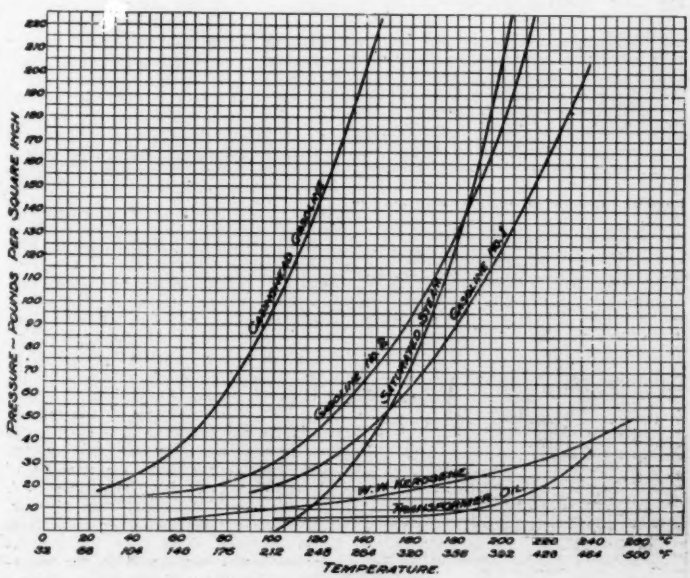
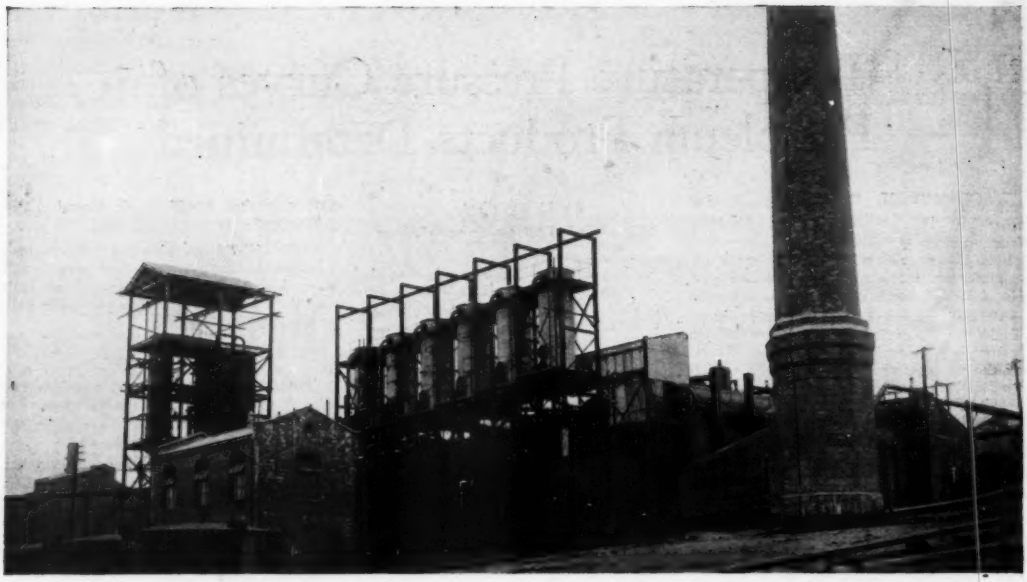


FIGURE 1

*Specifications committee methods for testing petroleum products, Tech. Paper 298, Bureau of Mines, 1922, p. 13.

**Marks, Lionel S., and Davis, Harvey, Tables and diagrams of the thermal properties of saturated and superheated steam, 1919.



Crude bench with preheating apparatus at plant of National Refineries, Ltd.

British Concern Operates Model Refinery

Plant located 6,000 miles from source of production

Oil refining in the British Isles has been carried on to a limited extent for many years, but it is only lately that this industry has become of real importance. The new National Refineries, Limited, plant at Llandarcy, in South Wales, marks a new departure in the location of a refinery. This plant is 6,000 miles away from the source of production. The general argument justifying this new British enterprise is precisely that which applies to any other British industry using imported raw material. The British motorist, for example, is better protected against a shortage of gasoline should the increased internal consumption of gasoline in the United States of America cause a serious curtailment of supplies for export. One of the many advantages of refining oil in this country is that it enables the refiner to manufacture readily and under most advantageous conditions, the various valuable products from petroleum, such as motor and aviation spirits, turpentine substitute, lamp oils, gas oil, various grades of lubricating oils and grease, several classes of paraffin wax suitable for industrial purposes, including candle manufacture, fuel oil for direct steam raising and for internal combustion engines, asphalt, road oil, etc. It is not practicable to manufacture many of these products at the source of production, owing to climatic conditions, cost of purchase and transport for finished goods as compared with the transport in bulk to the consuming market of the crude oil. First construction operations were started in February, 1919, in the building of a spur railway from the main line of the Great Western to the refinery site in the neighborhood of Skewen. The area now occupied by the refinery and tank farm was at that time a waste of rabbit warren and low lying bog land. With the efforts of a small army of workmen it was not long until the great plant began to take shape. A few months later work was commenced on the picturesque model village of Llandarcy. Here a number of the process and other workers are comfortably housed. Crude oil is brought to Skewen from Persia in oil tankers, which are owned or operated by the British Tanker Company, another subsidiary of the Anglo Persian Oil Company, and forms what can be described almost as a floating pipe line, linking Abadan, the company's port in Persia, with the home port. The company operates at present two berths. Another is under construction so that it will very soon be possible for three vessels to berth and discharge or load their respective cargoes simultaneously. The area at the docks is known as the "Transit site," in which are the great storage tanks of 80,000 tons total oil capacity, a powerful pumping station and a series of pipe lines. The transit site is connected with the refinery by many large pipe lines. The refinery area, tank farm, and model village, cover 650 acres of land and all of this except the village is closed and kept under careful guard by special police detailed for work in this area. The most striking feature is the large water tower situated at the highest point of the property. Surmounting this is a look out, from which every part of the refinery and tank farm can be seen. Elaborate precautions are taken against fire. No visitors are permitted at the refinery, unless they are able to produce passes issued by the company. A no smoking order is rigidly enforced and as an additional pre-

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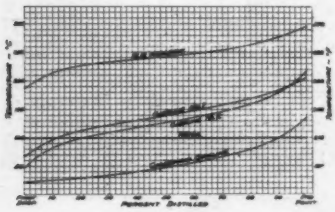
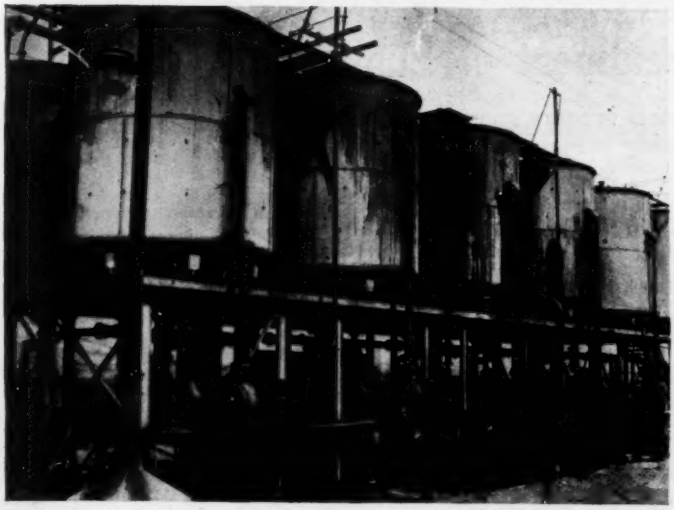
the product. The temperature-pressure curves, however, are not parallel, due to the varying composition of the products. For the same reason the distillation range curves are not parallel.—Reports of Investigations, U. S. Bureau of Mines.





Benzine washers used by English refinery

caution, curious-looking fireless locomotives are known as "Thermos Flasks" from the fact that they operate on bottled steam. The refinery was very carefully planned and advantage was taken of the knowledge gained from practical experience in other refineries throughout the world and from the studies of the company's own staff of research chemists, who have for some years past, been closely examing the properties of the Persian Oil and designing refining units with a view of securing from it the best possible quality and quantity of product. The crude is first run through a continuous system which was designed for maximum economy of fuel. Many heat exchangers and pre-heaters utilize heat from still vapors and the residues. The volatile products are treated continuously. Among other interesting refinery details are the following: The refinery generates its own electricity by means of three huge turbo-generators which supply the electricity required to light the entire plant and operate the numerous oil and water pumps, many of which are of the two and three stage centrifugal type. Granular bauxite is used for filtering. Fresh water is supplied from a reservoir of 13,000,000 gallons capacity. The company maintains a complete laboratory at the plant as well as their research laboratories near London. The construction of the plant required three years of continuous work and $15,000,000. The company's products are marketed in the British Isles under the B. P. Brand name. Their motor spirit or gasoline is straight run from a clear uniformed petrol and contains no cracked spirit. They also manufacture a complete line of refinery products including lamp oils, lubricating oils, gas oils, road oils and asphalt.

D'Arcy Oil Is Tested; Shows "Good Quality"

E. M. Bailey, chief chemist, Scottish Oils, Ltd., has analyzed samples of crude petroleum from D'Arcy bore, Dalkeith, and reports the crude of "good quality, having iodine absorption of 2.92 per cent. It yields a fair percentage of motor spirit and kerosene of good quality, as well as large percentage of solid paraffin wax. Products are easily refined and paraffin is readily extracted under certain conditions, yielding a crude solid paraffin scale of excellent quality and of very pale color, which on sweating yields a good wax."—Oil Eng. & Finance, 6-24-22.

"Reichskraftstoff" Is the New German Motor Fuel

"Reichskraftstoff," the new German motor fuel, is reported to give very good results and is composed of motor benzol 50 per cent, tetralin 25 per cent, alcohol 25 per cent.

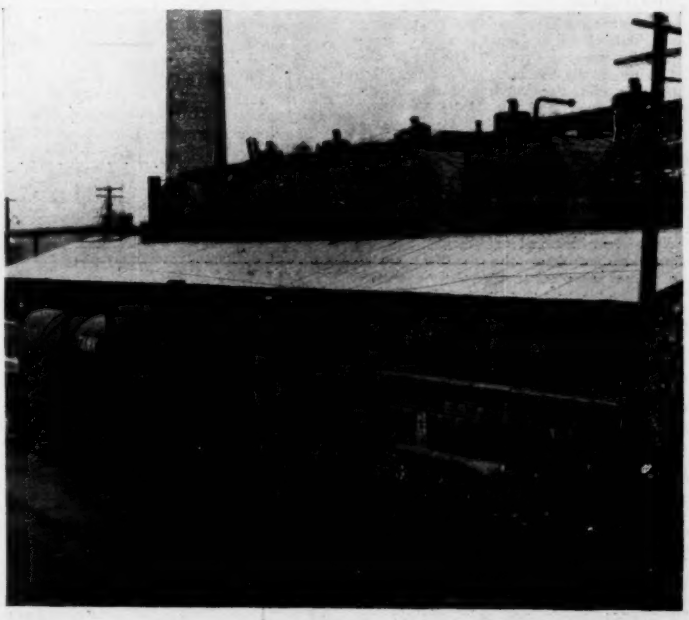
As the available supply of benzol is over 60,000 tons yearly, and the output of tetralin exceeds 30,000 tons, industrial alcohol plentiful, the mixture will supply all the motor fuel required.

The mixture is more or less a compromise as tetralin, though of high calorific power, is unsuitable by itself, and while mixed in equal proportions with benzol it gives good results in the engine, the combined density of the two (about 0.920 22.2 Be.) is a drawback. This, however, is remedied by the addition of the alcohol, the low calorific of which is counterbalanced by the greater heating power of the tetralin.—Kluegmann in Hamburger Fremdenblatt.

Moore Plant Installs Dubbs System Stills

Arkansas City, Kans., Aug. 5.—The Moore Refining Company, Arkansas City, Kansas, is installing four Dubbs cracking stills, each of 500 barrels capacity. The Moore plant obtains its crude supply from the Tonkawa, Billings, Garber and Burbank fields.

Chicago, Ill.—Orders of General American Tank Car Corporation for the first six months of 1922 aggregated approximately $21,000,000 as against $14,900,000 for the entire year of 1921.



Lubricating oil bench in National Refineries' plant with fireless locomotive in foreground

Chemical Treatment of Lubricating Oils

Process is more complicated than treating naphthas and gasoline

By F. N. Williams

The treatment of lubricating oils is much more complicated than treating naphtha or kerosene and is a process requiring considerable skill and experience on the part of the operator. The method of handling and the manner in which the oil is manufactured contribute largely to the resultant success or failure in treatment.

The ends in view in treating lubricating oils are obtaining a desired color both by transmitted and reflected light, removal of all possible free carbonaceous matter, and general purification. Lubricating oils are treated in agitator of from 500 to 2000 barrels capacity and of practically the same type as those in which light oils are treated with the following exception.

The agitator into which acids are worked is fitted with swing pipes which may be raised or lowered at will by means of a windlass and chain. This enables the treator to start pumping the oil out from the top and permits the remainder of the oil a longer time to settle. The cones are steeper in order that the heavier sludge may drop to the botom.

Two Agitators

Two agitators are in a set, that is one is called the agitator and the other the wash tank. In the agitator the acids are worked, settled and finally drawn off through a valve at the bottom of the cone. After all the acid has been drawn off, the oil is transferred to the wash tank which adjoins the agitator and there neutralized and finished.

The wash tank is equipped with heater coils both closed and perforated and spray pipes for washing the oil. The water outlet being at the bottom of the cone. Lubricating oils after treatment are bright, clear and pure and should be absolutely free of any chemical used in treatment.

The sulphuric acid attacks and removes or dissolves the impurities, chiefly free carbon and asphaltic matters as well as numerous other constituents partially

Proposition of Paraffin

Practically all petroleum consists principally of paraffins and naphthenes. In the American petroleum the paraffins are in the larger proportion, naphthenes occupy secondary position also in smaller proportion are present the hydrocarbons of the benzene series, which play an important part in the general character of a petroleum, while ethylenes and non-saturated naphthenes are comparatively of small importance. The paraffins and naphthenes are much more resistent to reagents than the benzenes, ethylenes and non-saturated naphthenes, thus rendering the partial removal of these constituents from mixtures with paraffins and naphthenes a fairly easy matter.

For example, if a crude is treated with concentrated sulphuric acid, the ethylenes and non-saturated naphthenes are dissolved by the reagent and form a mixture of sulphuric acid and other products, leaving as a residue the paraffins and saturated naphthenes which are only slightly attacked by the acid. In commercial practice with large quantities of oil, the changes brought about by the acid treatment are very noticeable. The temperature of the oil at start of treatment and the duration of agitation depends upon the grade or class of oil to be treated. The acid is usually introduced in three portions, each preceding portion being agitated, settled and drawn off before the introduction of the second and third portion. The last portion is usually collected by the addition of water. Water is introduced during agitation, this causes a gathering together of the fine particles of sludge, and is due to the great affinity of acid for water.

Must Use Care

The particles become gradually larger and when they reach the maximum size the agitation is stopped, when the bottom outlet valve must be immediately opened to prevent the sludge acid from becoming hardened which will occur upon standing to such an extent that it will be impossible to remove it through the bottom line but would have to be dug out from the inside with pick and shovel after the oil had been removed. Care must be taken that agitation with water is not carried on too long, as the flakes or particles of sludge consist of a small amount of water and acid coated with asphalt which would come apart, leaving acid water in solution in the oil giving great trouble later on.

After the oil has settled the required length of time, it is pumped into the wash tank where it is treated with alkali and hot water, the alkali solution neutralizes with the minerals and unchanged petroleum acids and the hot water washes out the alkali. When the soaps have settled and are drawn off the oil is tested for alkali or acid and if free of same is air blown until bright and free of moisture. Great care must be taken to ascertain that the oils are free of soda salts, etc., before blowing bright although an oil containing alkali may be blown bright, as it will darken in storage. After an oil has been carefully handled through the acid and alkali processes, but has not received the necessary wash, it may be detected by shaking a small portion of the oil with an equal amount of hot distilled water.

Oil and Water Separates

Upon standing, the oil and water should separate with distinct and individual clearness but if the oil remains turbid and the water assumes a milky appearance, it indicates the presence of soda salts. Some refiners may, in an attempt to save a little time or by carelessness blow an oil bright before it has been adequately washed and in this case the water is vaporized leaving the chemical in solution in the oil.

Spindle and neutral oils require from 6 to 15 pounds of acid per barrel, as is the case with pale oils, engine and auto, depending upon the color desired. Red oils which are generally reduced oils, and therefore require a little more acid while heavy red oils sometimes contain small amounts of free carbon due to slight decomposition caused by local superheating in the stills should be treated if 15 or 20 total is to be used with four to five pounds for the first portion rather than a larger amount as the free carbon will afford a greater attraction for the acid than the oil and the acid will become tarry almost immediately. This tar also having a greater affinity for the acid than the oil has. Thus if a large quantity of acid should be used in the first portion, the amount necessary to combine with the remaining acid before the acid could work on the oil. On the other hand, the small amount would combine with and remove the free carbon and allowing consequently a larger portion to work directly on the oil. Heavy red oil should be treated at from 110 to 130 degrees F., and may be washed at 180 to 190 degrees F.

Emulsification During Treatment

This trouble is due to many causes, poor distillate, excess of acid. careless handling, etc., excessive acid in the oil when the alkali is introduced is, of course, a common cause. A large amount of alkali is necessary to neutralize the excess acid, this forms large quantities of soda soaps. The oil turns white and appears very much like a soluble oil. If agitation is continued a "batch of slops" will result.

Neutralize Excess Acid

The proper method of handling batches of this type is to neutralize the excess acid as quickly as possible and with the least amount of agitation and allowing soaps to settle out thoroughly. After drawing the liquid soaps off, the oil should be washed without agitation and then if the oil is only slightly acid, neutralization and washing may be conducted in the usual manner.

Treating Loss

Pale oils 6 to 12 per cent, red oils 8 to 18 per cent, crudes 6 to 10 per cent, the loss in the case of lubricating oils and especially heavy oils is in tarry matter, the evaporation losses being neglible.

Changes in Viscosity

Paraffin base lubricating oils generally lose in viscosity from 5 to 20 points Saybolt at 100 degrees F. in treating, depending upon the initial viscosity. This loss in viscosity is due to removal of the viscous tarry matter by the acid. Overhead asphalt base lubricating oils lose little in viscosity and sometimes gain, this being probably caused by increased density due to polymerisation which in the case of the latter oils seems to overcome the lost indensity brought about by the removal of the tarry products. Reduced asphalt lube oils lose considerable viscosity in treatment, generally 20 to 50 points, Saybolt, depending upon their initial viscosity.

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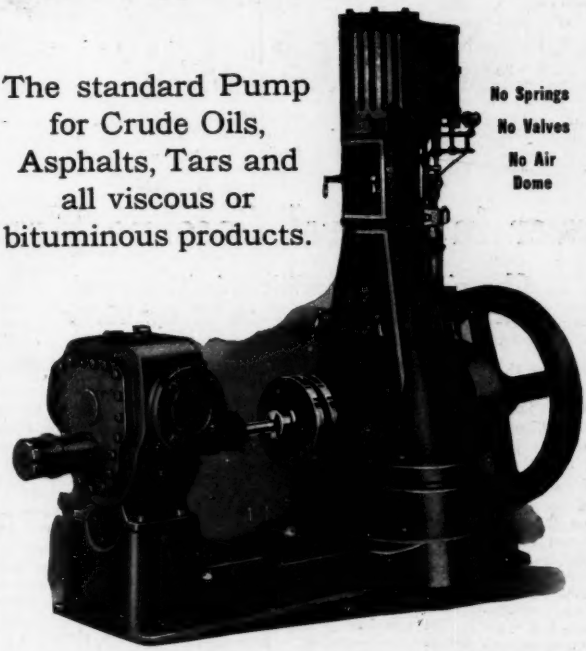

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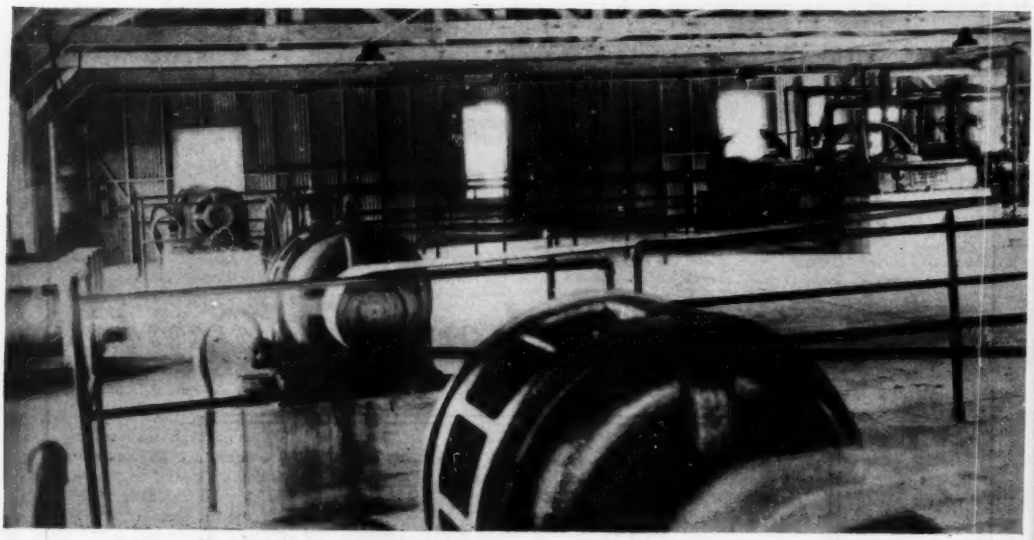


Motor driven compressors in Shaffer Oil and Refining Company's plant near Beggs, Oklahoma

Power in Natural Gasoline Plants

Changing field conditions in Texas and Oklahoma brings the use of electricity

By J. F. Carter, Jr.

Tulsa, Okla., August 1.—Less than three years ago the use of electric power equipment in natural gasoline plants in the Mid-Continent field was an experiment—something new and by no means a practical proposition in the eyes of oil men. Out in California a successful performance record was being established for motor-driven compressors but because of the difference in methods of operation and in marketing arrangements Oklahoma and Texas refiners were not so easily enthused over the possibilities of installing auxiliary power for their gas engines when electricity cost money—good money—and their supply of residue gas came without any charges attached. Figured on such a dollars-and-cents basis the use of motors in the Mid-Continent did not offer economy in the actual power developed.

Changing Field Conditions

Changing field conditions have been largely responsible for overcoming this opposition to motor power in compressing natural gas in Oklahoma and Texas. In reviewing the progress which electrical power has made in the natural gasoline industry in the Mid-Continent one superintendent expressed his case in this blunt manner: "We were absolutely driven to the necessity of installing motors in our plant. Our engine equipment was in good shape but repairs had to be made periodically and when we came to figure in the time lost from such shut-downs we found that the delays not only had reduced the output of the plant for the year but had ran up the cost of operation so that we had to have auxiliary power and our supply of residue gas was not sufficient to warrant the installation of additional gas engines. We had to put in motors and we did and I may say that their operation has been very satisfactory." This case probably is typical in sections of Oklahoma where electricity has been called in to supplement other power in natural gasoline plants.

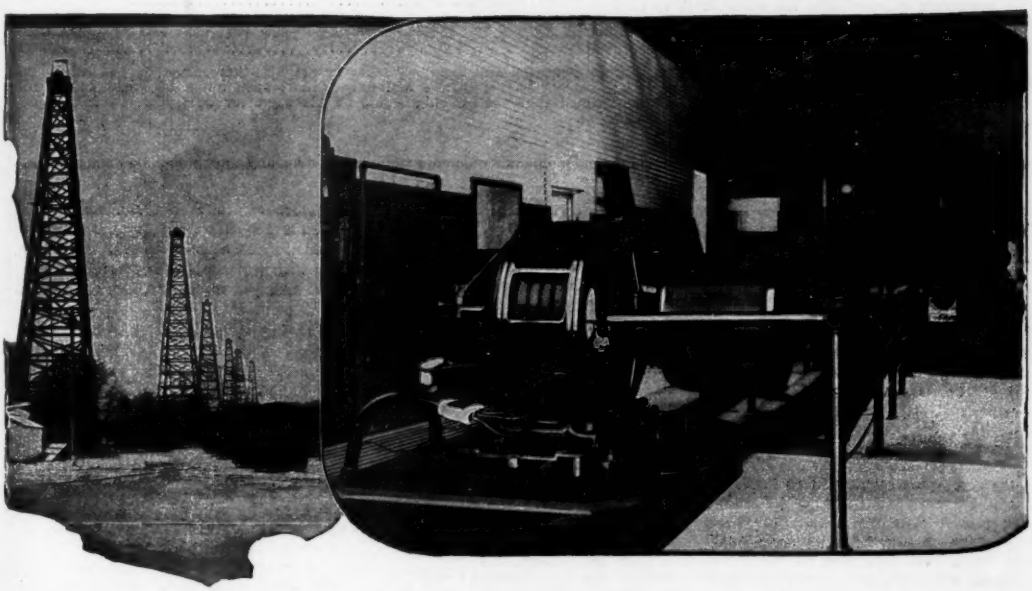
There is hardly a plant superintendent but who admits that motor-driven compressors give him less trouble as to shut-downs and delays than engine equipment. This advantage of the motor they admit right off, but when it comes to figuring the upkeep which includes the cost of the current most any superintendent is capable of producing cost sheets which place the gas engine in a very favorable light. Where the supply of residue gas is abundant and is available for use in the plant the motor has to go up against a great many odds which even up to this time in many instances have been too great with the result that the introduction of electrical power equipment has been held off and likely will be until the field has had extended development. But in the older fields where the gas is richer and where power is required on the leases to recover the oil the motor has had its opportunity.

In Oklahoma many of the natural gasoline manufacturers obtain their casinghead gas by a lease agreement by the terms of which the residue gas in to be returned to the lease for the operator's power. This contract reduces the fuel available for running the engines and has brought about the installation of motor-driven compressors. This condition is not so prevalent in Texas today but it is believed that the practice will spread to that State as the West and North Texas gas fields age and as they are more extensively developed. So that the conclusion may be drawn that as the fields of the Mid-Continent grow older the supply of residue gas for plant power will diminish and the opportunity for electrical energy will increase.

Probably the largest consumer of electric current in the manufacture of natural gas in the Mid-Continent today is the Chestnut and Smith Corporation with general offices in Tulsa. This company operates a plant in the Ranger field in West Texas on electricity exclusively and has installed in its No. 9 plant at Kiefer, Oklahoma, about twenty miles from Tulsa in the northeastern part of the state, motor-driven compressors. Other companies in Oklahoma that have turned to electricity for a part of their power in running natural gasoline plants include the Mid-Co Gasoline Company, now in the hands of receivers, and the Shaffer Oil and Refining Company. So far as is known here there have been no motor installations in natural gasoline plants in Kansas or in North Louisiana fields.

The Chestnut and Smith plant at Kiefer, Oklahoma, has its power equally divided

Electric motor drive is the most economical for casinghead gasoline plants



MOST casinghead gasoline plants are now driven by gas engines, using residue gas for fuel. Engine troubles however, are found to be the cause of big loss in gasoline production, more than offsetting the cost of electric power for motor drive. Speed variation also reduces output.

A Mid-Continent plant a short time ago replaced two 200 H.P. gas engines with two 200 H.P. squirrel cage induction motors. The average shut-downs per engine per month were greatly decreased, which more than paid the monthly power bill. In addition, the steadier speed at which the compressors were driven increased materially the daily production. The operating company was convinced of the advantages of electric drive and are now completing the installation of ten additional similar equipments in this field.

Motor drive for vacuum pumps is even more necessary than for compressors. These pumps must be operated continuously at a fixed speed or the neighboring lease will profit by your loss. Any shut-down means a production loss of from 10 to 18 hours, the time required to again build up a vacuum.

The G-E oil well specialist in your district will gladly explain to you the advantages of electric drive for vacuum pumps, compressors and circulating pumps for casinghead gasoline plants and also for oil wells.

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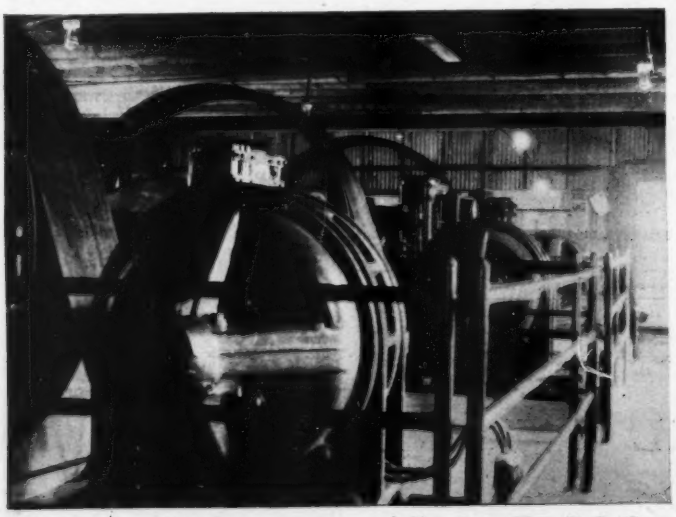
One 50 H.P. gas engine with small compressor and for auxiliary	5,000.00	One 25 H.P. motor for auxiliary drive	500.00
One direct current generator and switchboard (for lighting)	500.00	Total	$6.000.00
Total	$17,000.00		
Monthly Operating Cost—		Monthly Operating Cost—	
Interest (8%), Depreciation (20%) on initial investment	$397.00	Interest (8%), Depreciation (5%) on initial investment	$65.00
Lubricating Oil at $2.25 per day	68.00	Lubricating oil	1.00
Repairs at $35 per engine	105.00	Electric Power	673.00
Two more men required than for motor drive at $125 per month each	250.00	Repairs (estimated)	5.00
Total	$820.00	Total	$744.00

NOTE—This table has been prepared by a firm of electrical engineers operating in the Mid-Continent field and offers evidence as to their side of the case. These figures are subject to verification and only include such items as would be effected by change from gas engine to motor drive. It is assumed that the building would be the same for both powers and that the auxiliary equipment and other detail would not be changed.

between gas engines and motors. The equipment consists of six single-cylinder compressors driven by gas engines and three two-cylinder compressors driven by three 100 H. P. motors of the squirrel cage type. The installation work is of the best and accounts for the good performance record already made by the electrical power equipment. All of the wiring in the plant is in iron conduit and all switches are of the oil-brake type, thus eliminating all sparks and dangers from electric current. A close-up of this installation is obtained in the accompanying view taken inside the plant. For continuous service the motors have proven their worth and are giving entire satisfaction for the work to which they have been put—that of furnishing auxiliary power in cases of emergency or shut-downs.

Electric energy for the Mid-Co plant at Billings, Oklahoma, in the north central part of the state is generated on the lease. From an engineering standpoint, the Mid-Co installation is a crowning achievement and can be classed with the best in the United States. However, in making their investment the Mid-Co people probably overestimated the supply of gas available for their use and the plant today is not being operated at capacity. The electric power is generated by means of steam turbine with gas used as boiler fuel. The plant equipment consists of four 180 K. V. A. synchronous motors of the most modern type and the performance record of these motors has been a big talking point for electrical engineers in the oil country. Ten pumping motors on the Mid-Co lease also are operated on the electrical power generated at the plant.

The equipment in the natural gasoline plant of the Shaffer Oil and Refining Company south of Beggs, Oklahoma, in the eastern section of the state consists of two 75 H. P. squirrel cage type motors and two 50 H. P. squirrel-cage type motors on vacuum pumps. This plant is not in operation at the present time so a performance record is not available. Lack of an available supply of natural gas is given as the reason for the shut-down. The wiring in the Shaffer plant follows the same arrangement as in the Chestnut and Smith plant at Kiefer.



Interior view of Kiefer Plant of Chestnut and Smith Corporation in Oklahoma

The big advantage which the electric motor has to its credit is the low cost of the initial investment, which is about one-half of that required in the installation of new engine equipment. The cost of the compressor is figured when computing the initial investment on both kinds of power and this gives rise to a seemingly paradoxical situation wherein the advantage which the motor enjoys over the gas engine in this respect is turned to the disadvantage of the electric power. Proponents of gas engine equipment admit that fewer shut-downs are experienced with the motor but they hasten to add that compressors must be worked on and repairs made on them and that this necessitates the shutting down of the motor so that actual running time is reduced more in proportion to the continuous performance record of the engine power. It is pointed out by electrical engineers that the labor cost at natural gasoline plants is reduced through the use of electric motors which do not require constant attention and oversight. In recalling a recent visit to a natural gasoline plant in Oklahoma where both motor and engine power were in use, an electrical engineer observed that the engine attendant and his helpers were nearly always at the end of the building where the gas engines were used. This engineer drew the conclusion that the motors were doing their work and could be left alone.

Another advantage which the electric power is coming to enjoy is the part it plays in conserving fuel gas on the lease where pumping power is required by the oil operator.

The maintenance cost gives the gas engine a distinct advantage under present conditions in Oklahoma, according to some plant superintendents who have had experience in paying for electric current. The cost of the current at the present time prohibits the complte electrification of plants in the state and has been the

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THE REFINER AND NATURAL GASOLINE MANUFACTURER—Monthly, a semi-technical journal going to refinery and casinghead gasoline plant superintendents and executives, carries articles on new refinery processes, refinery methods, articles on refinery operation and management. Does not carry market reports. It is edited by practical refinery engineer of long experience. Price, $1.00 per year.

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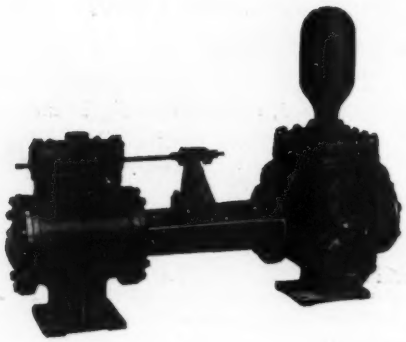

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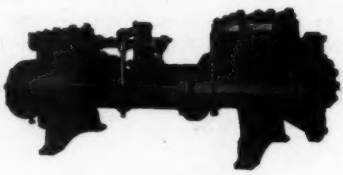

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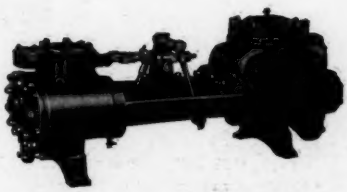

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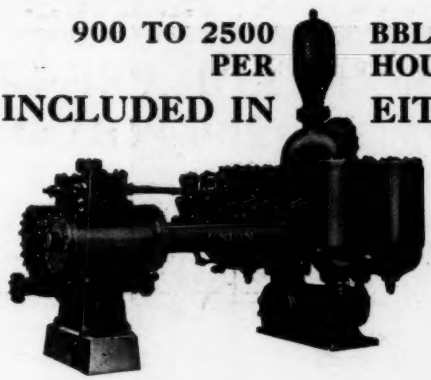

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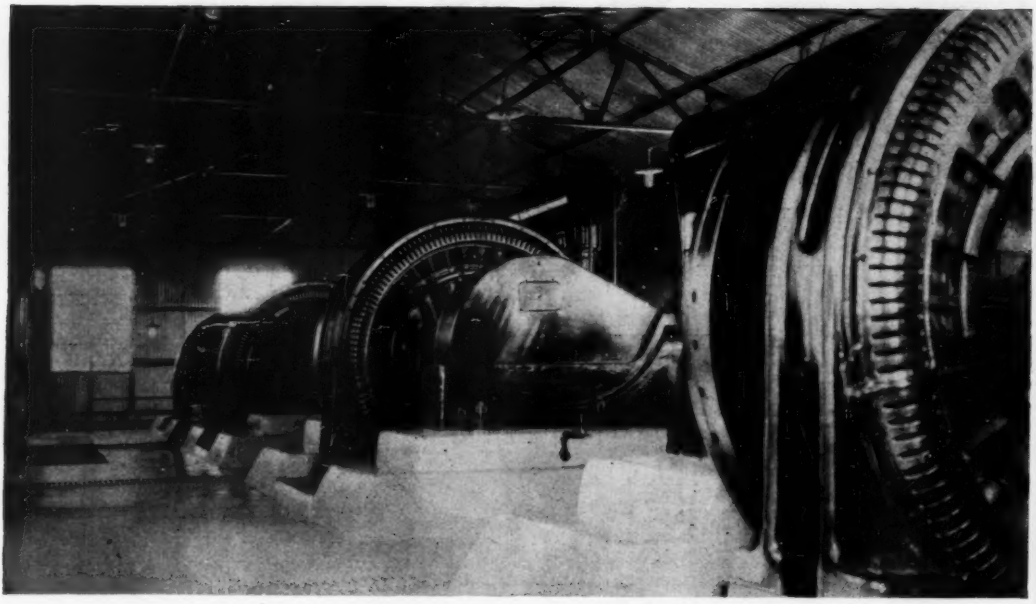
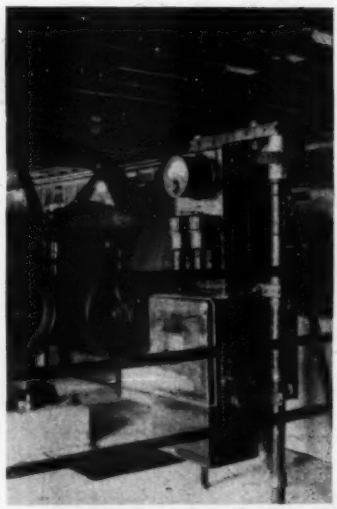


Synchronous motors in the Billings, Oklahoma, plant of the Mid-Co Gasoline Company

cause of reducing the number of running hours in the performance record of auxiliary motors in plants only partially equipped for electric energy, these superintendents state. One has estimated that his electric current averages between 3½ and 4 cents per kilowat hour. In Texas it is stated that the charge is less, due largely to decreased costs of developing and delivering power and a desire on the part of the power companies to build up a business in a comparatively new field. The charge for electric current in Oklahoma, as in Texas, is based on a graduated scale and in estimating the cost of supplying current a primary charge is included. It is estimated that the average cost of current in Oklahoma for oil field power use is about three cents per kilowat hour, although the graduated scale provides for a much lower charge on a large consumption. The power companies in both West Texas and Oklahoma have so extended their service as to be able to connect up a plant situated almost anywhere in the producing area and this is proving a big factor in extending the use of electrical energy to oil company leases.

It is generally agreed that a three or four unit gasoline plant is the most practical for installing motor power for compressors, although the factor governing the installation really is the amount of gasoline recoverable per thousand cubic feet of gas from the wells. If the gas is rich enough a one unit plant can operate on electric power, engineers declare, and if the gasoline content is not high a six or ten unit plant cannot operate profitably by motor. From an economical standpoint it is generally agreed that at least from four to five gallons per thousand cubic feet must be recovered to make



Compensator switch or motor control in Chestnut and Smith plant

compressing with motor equipment a profitable enterprise. Below that the use of electric current would not be practical.

Pittsburgh, Pa., Aug. 15.—M. B. Cooke, assistant refinery engineer, Bureau of Mines, has been assigned to the work of investigation of the cause of gum formation in gasoline in storage.

The work may require two years time.

Improved Methods for Making Carbon Black

Washington, D. C.—Probably the most beneficial line of improvement of present commercial methods for the manufacture of carbon black lies in changing the design of the plants so that the cost of construction will be diminished.

The control of the air supply should be regulated more efficiently and provision should be made in the design to render plants independent of weather conditions, especially of winds. Thermal decomposition probably offers the most promising method of increasing the quality of black from natural gas. The present methods are destructive to the apparatus, a defect that undoubtedly will be overcome, and the resultant product contains grit or adamantine carbon, is grayish and contains some volatile matter.

In the present methods of manufacture, carbon black is made by burning natural gas with a luminous flame against a metal surface and then collecting the liberated soot. The process produces from one-half pound to two pounds of black per 1000 cubic feet of gas, or 1.5 per cent to 6.5 per cent of the total carbon in the gas. The industry consumes about 40,000,000,000 cubic feet of gas annually in the United States.—From Bulletin 192, just issued by the Bureau of Mines.

Tulsa, Okla.—Sinclair Refining has leased to the Tulsa Oil Products Company all of its filing stations in Tulsa. This move leaves Sinclair Refining with the marketing end of the business in Tulsa and does away with the retail trade. It is understood that the stations had not proven profitable for Sinclair to operate.

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3503	1/2	25/32	5/16	13/32	1.50
3504	9/16	7/8	11/32	29/64	1.50
3505	5/8	1	13/32	23/64	1.50
3506	11/16	1-3/32	7/16	9/16	1.50
3507	3/4	1-3/16	31/64	39/64	1.50
3508	13/16	1-9/32	33/64	21/32	1.50
3509	7/8	1-3/8	35/64	45/64	1.50
3510	15/16	1-15/32	19/32	3/4	1.50
3511	1	1-19/32	41/64	13/16	1.75
3512	1-1/8	1-3/4	45/64	57/64	2.00
3513	1-1/4	2	51/64	1-1/32	2.25

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No.	Dia. Rivet	Cup Width	Cup Depth	Price Each
3551	3/8	21/32	9/32	1.50
3552	7/16	3/4	21/64	1.50
3553	1/2	7/8	23/64	1.50
3554	5/8	1-3/32	15/32	1.50
3555	11/16	1-3/16	33/64	1.50
3556	3/4	1-5/16	9/16	1.50
3557	13/16	1-13/32	5/8	1.50
3558	7/8	1-17/32	21/32	1.50
3559	15/16	1-5/8	45/64	1.50
3560	1	1-23/32	47/64	1.75
3561	1-1/8	1-27/32	51/64	2.00
3562	1-1/4	1-15/16	53/64	2.25

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Absorption Plants in California Fields

Lean gas in West Coast districts brings about many installations

The double reason why practically all the recent gasoline plants in this state have been absorption plants is in the smaller initial cost of such plants, and in the further fact that broadly speaking California gas is a lean gas, according to an official of one of the leading manufacturers of natural gasoline on the west coast.

That both these generalizations need further explaining, is admitted by the authority mentioned, for their exceptions need to be pointed out in order to more firm establish the rule.

As to the relative cost of the equipment for the different methods of processing the natural gas, the quality of the gas, the longevity of its output in any immediate section, and various other factors have to be taken into consideration. For immediate results, and especially if the gas is lean, or even relatively so, it seems that absorption is the more economical method, according to those who are building plants now.

California gas is lean in gasoline content, with the exception of certain fields. In the new Long Beach and Santa Fe Springs districts, where several plants are being built now, the gas produced is very wet in particular wells, and varying slightly for other wells, but generally a good quality casinghead gas. In spite of this fact, operators are depending upon absorption rather than compression, in their new plants, and from at least one owner comes the explanation of comparative first costs.

It is said that the machinery, laid down in California, for compression, costs approximately $10,000 a unit. This represents just about half the cost of complete installation, or $20,000 a unit is taken as a fair cost index of compression plant equipment, all rigged and ready for action. Thus a ten-unit plant costs, completed, about $200,000.

On the other hand, absorption plant equipment is said to represent considerably less than this investment, some owners even putting the cost at one-fourth that of compression. If the two methods were equally productive, with all grades of gas, there would be no further comparisons necessary. These comparisons are naturally based upon the footage capacity of plants, and not on the capacity of their output in gasoline. Labor and upkeep is considerably less with the absorption method.

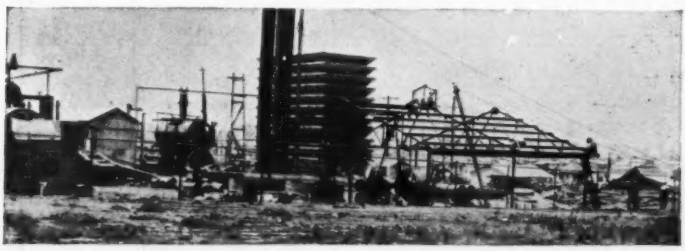
The average yield of gasoline by absorption per million cubic feet of gas in California is .9 gallons. This was an average for 1921. The new fields in southern California will probably alter the average for 1922, though not considerably for no plants are yet in operation in these fields, though several are under construction.

There was only one other state which showed a higher yield by the absorption process, and that was Texas, with 1.0 gallon per thousand cubic feet of gas processed by this method. Oklahoma showed .7 gallon per thousand, being next to California.

By the compression and vacuum method, however, most of the states had a higher recovery than California. Here, again, Texas took the lead, with an average of 4.6 gallons per thousand feet of gas, with Oklahoma second in rank, showing an average of 3.7 gallons per thousand. California was the lowest state, in rank, among all those producing natural gasoline by compression, showing an average of only 1 gallon to the thousand feet of gas by that process.

This latter fact may throw additional light on the reasons why California is building only absorption plants now.

There are 44 compression and 33 absorption plants in California.



GILMORE'S GASOLINE PLANT AT SIGNAL HILL

This is one of three similar plants now under construction by different companies in the new Long Beach field. It is estimated that 50,000,000 feet of gas is already available for processing in this field, and it is a richer gas than is found in most California fields. The absorption method of gasoline recovery is steadily gaining favor on the west coast.

Rate of Evaporation Losses of Gasoline in Storage Is Shown

Gasoline, naphtha, light crudes and any oil containing volatile matter in any quantity are subject to serious evaporation loss when stored in tanks which are not gas tight.

The rate of evaporation depends on the grade of oil, the class and condition of the tank with reference to hatches, gauge hole openings, windlass housings and the general condition of the roof.

Some of the larger refining companies are welding the roof sheets on tanks, making them absolutely gas tight.

This is a safety measure as well as one of economy, the danger of a gas tight tank being ignited by any means is practically nil.

The following table, taken from actual refinery determination, indicates the rate of evaporation of casinghead and straight run refinery gasoline.

	Casinghead	Refinery
Gravity at start	81.1 Be.	60.4 Be.
Temperature of gasoline	56 F.	62 F.
Temperature of room	70 F.	70 F.
Volume of Gasoline, C. C.	1,000	1,000
Volume after 24 hours	895	976
Volume after 48 hours	840	955
Volume after 72 hours	800	924
Gravity after 24 hours	79.6 Be.	59.2 Be.
Gravity after 48 hours	76.5 Be.	58.6 Be.
Gravity after 72 hours	76.0 Be.	58.0 Be.
Temperature after 24 hours	56 F.	..
Temperature after 72 hours	61 F.	60 F.
Loss % in 24 hours	10.5	2.4
Loss % in 48 hours	16.0	4.5
Loss % in 72 hours	20.0	7.6

Tests made in laboratory using ordinarywas quite moderate, the loss would have liter jars as continers. It will be notedbeen much greater at summer temperthat the temperature in the laboratoryatures.

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Careful analysis proves that the surplus of tank cars during the past two years was due to the faster handling by the carriers when their other freight business was excessively light. Therefore, with the heavy freight business that must follow settlement of the coal and rail strikes, tank car shipments must increase also and car movements become slower. This predicts another tank car shortage.

There are fewer idle tank cars to-day than at any time during the past two years.

Deliveries of steel already are becoming very slow—another reason for buying equipment in advance of actual requirements.

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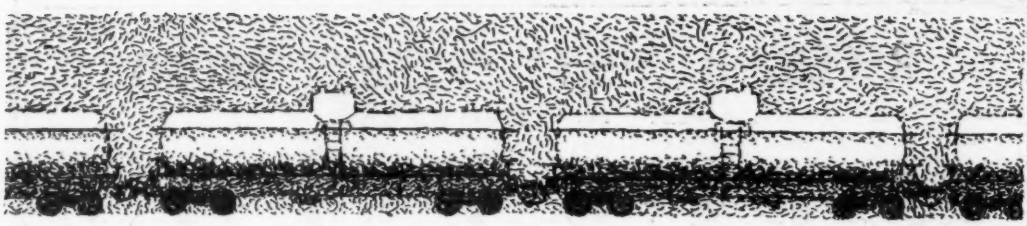


Protest Made Against Shipping Situation

Association writes letter to the Interstate Commerce Commission

TULSA, OKLA.—In an effort to bring about a better understanding between the shippers of the United States and the railroads, the Association of Natural Gasoline Manufacturers has written a letter to the Interstate Commerce Commission pointing out the existing conditions which the association claims are being watched with increasing alarm and resentment. A copy of the letter has been sent to every trade association in the country for the purpose of making a concentrated fight against the present tendency of the roads.

The letter to the Commission follows.

"To the Interstate Commerce Commission:

"The shippers of the United States, for the past several years, have been viewing with increasing alarm and resentment the tendency of the carriers and their accredited agents to:

"1st. Increase freight rates or disturb rules and regulations without apparent authority or excuse;

"2nd. To take advantage of technicalities and to place their own interpretation upon the orders or rulings of the Interstate Commerce Commission or other regulatory bodies to the end that they publish rates, rules and regulations that exceed the intent and purpose of the regulatory bodies, and create unjust hardships and unreasonable rate structures upon the commerce of this country.

"3rd. Long and unreasonably delay the making of proper adjustment upon order when such order reduces existing rates or modifies hardships of existing rules and regulations and,

"4th, By not providing properly for the shippers to have notice of contemplated increases or disturbances and giving said shippers a hearing for argument pro or con, and even when such hearing is granted it is merely a matter of form in so far as the carriers are concerned, for the reason, (a) that a decision has already been made which no argument will change, and (b) the carriers do not and will not produce any argument in open conference to convince a protestant of the incorrectness of his ideas, if, indeed, they are incorrect.

"Specific instances are numerous and of regular occurrence which bring about drastic increases and vital disturbances in rate structure and trade differentials, always to the detriment of the established order of marketing, and which tendency—where such orders reduce rates, and that seems to be ever growing in magnitude.

"That, in consequence of the practices above complained of, there are grave injustices being done the shippers of the country by the carriers and their agents in restricting markets, destroying long-established trade outlets and restraining the marketing of merchandise until, in desperation, the consumer turns to other sources of supply and methods of transportation.

"That it increases the work and expense of the shippers and regulatory bodies in checking ,protesting and suspending tariff issues that are unauthorized or irregular, besides causing enormous waste of time, money and material to the carriers themselves.

"That this practice is producing a spirit of resentment, suspicion and antagonism between the shippers and the carriers, and creating a state of public mind that looks upon the carriers as being unfair, and bent upon the policy of exacting and securing higher freight rates than the traffic should bear.

"All of which is bringing about a dangerous state in public sentiment which, unless the cause is removed, will certainly result in drastic action by the body politic to the end that the carriers be put entirely under government control (which will also be sponsored by the trade unions) or that restrictive legislation will be passed that will hamper and harass the carriers as they are now hampering and harassing business in general.

"Inasmuch as the present condition and either of the consequent conditions are not conducive to the best welfare of the country and the result would be, in a manner of speaking—"killing the patient to cure the disease,' it is earnestly recommended that your honorable body take such quick and direct action as will immediately relieve and stop the propensities complained of—that no carrier be allowed to make any changes whatever in rate structure, rules or regulations that will result in an increase of rates, charges or conditions affecting interstate commerce, unless such increases have been first duly authorized by the law of regulatory bodies and when so authorized that the carrier be held strictly responsible to not exceed such authority, as is now the common practice, and

"Further, that the carriers act with diligence and dispatch in putting Interstate Commerce Commission's orders into effect opportunity to present argument when increases or disturbances are contemplated by the carriers.

"This is not a resolution, but a straightforward, frank statement of conditions and the consequent sentiment engendered, and it is sincerely hoped that it will meet with the serious consideration and prompt action on the conditions warrant."

Says Casinghead Gas Weight Is too High

Tulsa, Okla.—The Association of Natural Gasoline Manufacturers has requested the consolidated classification committee at Chicago to make new classification for casinghead gasoline and liquified petroleum gas, gravity seventy and above, on estimated weight of five and five-tenths pounds per gallon instead of six and six-tenths pounds per gallon, the present estimated weight. The association points out that present weight is nearly 20 per cent too high and shows the average actual weight from 70 to 95 gravity is four and nine-tenths pounds per gallon, therefore the request for five and five-tenths pounds per gallon is fair.

New Absorption Plant East of Breckenridge

Wichita Falls, Texas.—The Texas Pacific Coal and Oil Company is erecting a 15,000,000-cubic foot daily capacity absorption plant on its A. S. Veale farm, Section 1423, T. E. & L. survey, five miles due east of Breckenridge, Stephens County, and will have same in operation by October 1. The plant when completed will be equipped with six vertical absorbers. According to preliminary tests made on the gasoline contents of the gas produced on the Veale lease and wells on nearby farms the recovery amounts to approximately nine-tenths of a gallon per 1000 cubic feet.

Tulsa, Okla.—Advices from DeNoya, a small town in the western Osage country in Oklahoma, are that the National Refining Company has purchased a tract of land which may be utilized for refinery works. No confirmation of the project has been given out by National Refining officials.

RECENT REFINERY PATENTS ISSUED

Washington, D. C.—The following patents on methods or machinery in the refining industry have recently been issued by the United States Patent Office:

No. 1,419,760. A process or method of refining oils, patented by Mercer Reynolds, Chattanooga, Tennessee. This patent is for a process of bringing off-color oils up to a desired color standard by repeating the alternate steps of refining and bleaching, said refining step including saponification. Issued June 13, 1922.

No. 1,421,228. Apparatus for treating oil-bearing shale patented by Gottlieb A. Heimbucher, Chicago, Illinois. The apparatus includes a furnace, a combustion chamber in the lower end thereof, a plurality of retorts mounted within the furnace above the combustion chamber, a wall having helical flues surrounding each of the retorts at its lower end portion, the wall being spaced from the outer wall of the furnace, segmental walls meeting at their ends, and spaced from the outer wall of the furnace partially surrounding each of the retorts at the upper end, the space inclosed by said segmental wall forming a heating chamber connected by said helical flues with the combustion chamber, and a stack connected with said heating chamber. In this apparatus the retorts are provided in their lower end with rotatable grates for supporting shale, a tapered perforated pipe projecting upwardly from the center of each grate, with means on the exterior of each pipe for agitating the surrounding shale as said grate is rotated, and means manually operable from the exterior of each retort for actuating its grate. Issued June 27, 1922.

No. 1,422,038. A method for the treatment of hydrocarbon oils, patented by David T. Day, Washington, D. C. This is a process of producing hydrocarbon oils having low boiling points from hydrocarbon oils having high boiling points, which consists in vaporizing at least a part of the oil to be treated and immediately compressing the material so treated in a cylinder by the action of a sliding piston which moves substantially instantaneously to generate pressure and heat sufficient to heat and compress the vaporized material to the temperature and pressure of the conversion. Issued July 4, 1922.

Harbor Pollution Laws Are Being Considered

Efforts of bathers, fishermen, etc., to obtain protection from the oil nuisance is becoming international in character. The chief complainants are located on the eastern American seaboard, the Atlantic coast of Europe, and the North Sea coast.

An "oil in navigable waters" bill has been taken up by the British Parliament, supported by government bodies, oil companies, shipping interests, and harbor authorities, which provides increased penalties, enforced by strict supervision, for the discharge of oil from ships within British waters.

However, this measure is not enough, as oil may be discharged well beyond the limits prescribed, and yet find its way to the shore line, and damage bathing beaches, piers, docks and harbors—the latter by creating an ever present fire hazard. Even New York has seen patches of the Hudson catch fire, once with danger to shipping.

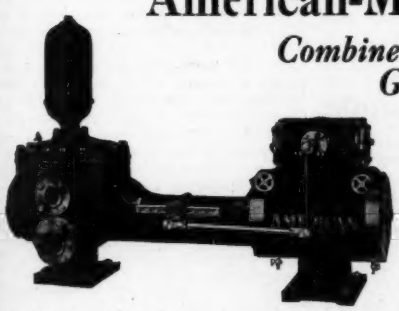
Oil floating on the sea is also a grave menace to sea life, killing sea birds by coating their wings so that they can not fly; and it is claimed the oil kills oysters, clams, and fish spawn. According to one authority, fish in British waters are dying in large quantities from eating oil-soaked vegetation.

To afford any relief the present rules will have to be supplemented by laws drawn up by a proper body and obeyed by masters.

Secretary Hughes has invited the maritime nations to a conference on the subject, and much good should result therefrom.

American-Marsh Refinery Pumps

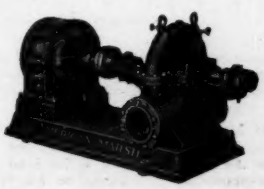
Combine High Efficiency With Great Durability



American-Marsh Pumps meet the demand for strictly high grade high efficiency units where absolute reliability over a long term of years is essential. Their heavy, rugged construction with extra wide passages and large valve areas make them ideal for handling oil and other heavy liquids.

The steam pumps are fully bronze fitted. Heavy cradle yokes are furnished between steam and water ends instead of tie rods, making expensive drip pans unnecessary.

American-Marsh Centrifugal Pumps are made in many different types, some of them especially designed for refinery work. Capacities range from 5 to 5000 gallons per minute and heads up to 250 feet.



The line includes:

Boiler Feed Pumps
Vacuum Pumps
Jet Condensers
Deep Well Engines
Air Compressors
Centrifugal Pumps
Oil Pumps
Acid Pumps

Write for General Catalog

American Steam Pump Co., Battle Creek, Mich.

Test of New Hoge Process Now Being Made in Houston Plant

The Hoge cracking apparatus is for treating petroleum vapors, comprising a receptacle containing a molten metal, maintained at about 950 to 1000° F., said vapors passing through a coil, surrounded by the molten metal.

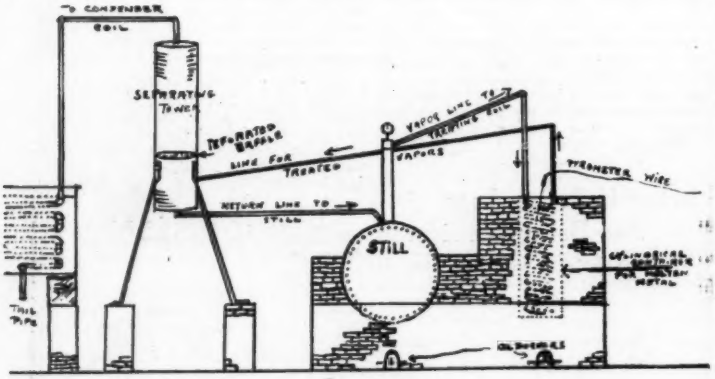
Uniform heating of vapors, eliminating formation of carbon, in coil is claimed.

The treated vapors pass from the coil into a separating tower, the heavier vapors condense and are returned to the still for re-vaporization and subsequent re-treatment in the cracking coil.

A test is being made in Houston and it is claimed the conversion is 80 per cent of gasoline distillate, when gas oil is thus converted.

A sample caught at the tail pipe when 30 per cent had been distilled off, tests as follows: gravity, 37.0 Be.; initial boiling point, 155° F.; 8% at 212, 18% at 302, 33% at 350, 42% at 365, 50% at 375, 65% at 400, and 94% at 460° F., end point, 488 F.

The above conversion was made from gas oil from West Columbia, Goose Creek, Jennings and Orange crudes. Gravity of gas oil, 30.0 Be. A small installation, capacity about 50 gallons, is being run for demonstration purposes, at the plant of the Transatlantic Petroleum Company, Houston, Texas.



HOGE CRACKING APPARATUS

Here Is Process Whose Claims Are Extremely Modest

Ninety one and four tenths per cent of 56 gravity motor fuel from Signal Hill crude is the claim made for a new process which will soon be in operation on the properties of an independent company at Long Beach.

A test run made with Long Beach (Signal Hill) crude showed 32 gallons of 80 gravity gasoline from 35 gallons of crude, according to the owners of the new process.

And the cost, as compared with straight run refinery equipment, is negligible. The equipment to handle a thousand barrels of crude a day will not cost more than $15,000, they say.

It is planned to have a plant ready for operation at Long Beach, on the properties of the Henderson Petroleum Company, within a few weeks. Already, miniature plants have been built, for test runs, with the results claimed above.

The principle involved is simply that of the saturation of a gas by a liquid, and then distilling the gas. In practice, the process is not so simple as it sounds. No official explanation of the method followed or the equipment used, has been made. But it is understood that the principal physical equipment consists of a heater and compressor, a specially designed agitator, and a condenser system.

The equipment, according to plans, will be set up alongside the well. The flow line from the well will be conducted into the agitator, direct. This agitator is "the business end" of the device. It is an inverted cone, with baffles inside, over which the oil is spread out into a thin film, and with which it contacts in agitation.

Into the bottom of the agitator is conducted a mixture of oxygen and natural gas, from the compressor, at 300 F., with a pressure of 20 pounds. It may be recalled that this mixture, under certain conditions of temperature and ratios, is capable of blowing hell off the hinges and the process, therefore, may be attended with some degree of risks.

Just how long the agitation takes place is not known. Nor is the exact proportion of oxygen to natural gas, known. But it is claimed that 91.4 per cent of the volume of the crude oil is vaporized by the process, and goes over to the condenser.

Regardless of what the process will actually accomplish in practice, it is being watched with some interest by those who know of it. It is recognized that many laboratory "discoveries" have petered out when applied to commercial usage, and likewise that every important principle has borne the brunt of unfavorable criticism at the outset.

If it should be found possible to vaporize anything like 90 per cent of Long Beach crude, or even 50 per cent, engineers say the discovery will upset the whole scheme of petroleum chemistry. This crude runs below 30 gravity, on an average, and the ratio of volatile constituents is certainly a long way below that of even 50 per cent.

Method Used by Refiners in Taking Care of Gas from Mexican Crude

The run-down lines from the stills charged with Mexican or other high sulphur crudes are tapped immediately after leaving the condenser boxes and connected to a gas main located on top of the condenser boxes, which is the method used by refiners in taking care of the gas evolved during distillation.

One and one-half to two-inch lines are also connected to the look boxes, which are made gas tight, and these lines lead to a six or eight-inch gathering line, which in turn connects into the gas main.

A vacuum is maintained on the entire gathering system by means of exhausters, two exhausters are used so that one will always be available.

Too high a vacuum is not desirable as it causes air to leak into the system and dilute the gas, rendering it hard to condense should a condensing or absorption system be installed.

The gas is pulled through a wet scrubber, or a series of scrubbers to remove a large percentage of the sulphur, etc., and then discharged into a gas holder.

The holder delivers the gas under a slight pressure to the different mains, which lead to the boiler house, stills, clay burner or anywhere in the plant the gas may be utilized.

It is necessary to take care of the gas form high surphur crudes on account of the toxic effect of such gas, and should the receiving house become filled with gas, employees in that department would almost immediately feel the effects of it.

Gas from Mexican crude, when inhaled, asphyxiates almost instantly, the victim being unable to call for help, beyond a gasping cry, but, fortunately, if removed to the fresh air quickly, recovery is almost as quick, and without any serious after effect.

The Bureau of Mines is starting a study of the gasses from high sulphur crudes, some of which are known to be toxic.

PURE OIL COMPANY INSTALLS FOUR CROSS CRACKING UNITS

Heath, Ohio, Aug. 15.—The Pure Oil Company has installed four units of the Cross cracking type at their plant here. Each unit will have a capacity of 700 barrels per day.

Western Petroleum Refiners Issue Bulletin on Gasoline Prices

KANSAS CITY, MO.,—The following bulletin has been issued by H. K. Davis, statistician for the Western Petroleum Refiners' Association, and is of interest to refiners generally:

"There is no reason why motorists should get excited over small fluctuations in the price of gasoline.

"The Standard Oil Company of New Jersey has computed that on the basis of the average annual gasoline consumption per car, an increase of one cent per gallon in the price of gasoline means an increase in the cost of operating a car of only $5 annually.

"From the following compilation, published in the current issue of The Lamp, it appears that the cost of gasoline is one of the minor items of expense in the operation of a motor car. The tabulation shows the amount out of each dollar that is spent by the motorist for the specified items:

Oil and grease	1.12 cents
Gasoline	10.26 cents
Tires	10.42 cents
Depreciation	15.38 cents
Miscellaneous	20.65 cents
Repairs	42.17 cents

"The figures of the Interstate Commerce Commission for the last available year, 1920, for all Class I railroads show the cost of fuel was 11.57 per cent of their total operating costs, while later figures for some of the larger roads during 1921 show a fuel outlay ranging from 10.17 to 12.59 per cent. Actual expenses for steam locomotives on all Class I roads during 1920 show that each dollar of expense was distributed as follows:

Oil and grease	.76 cents
Fuel	49.83 cents
Depreciation	2.83 cents
Miscellaneous	3.17 cents
Repairs	43.91 cents

"The fact that payments for gasoline are more numerous than expenditures for other items of expense necessary to keep a car on the road undoubtedly accounts for the popular but erroneous impression that the largest item of expense after buying a car is for gasoline."

Anglo-Persian Refinery Affects Gasoline Exports

The gasoline production of the new Anglo-Persian refinery at Llandarcy near Swansea, Wales, will undoubtedly be a factor in the amount of gasoline exported to the United Kingdom from this country, as the gasoline produced by that plant will probably supply about a third of the gasoline consumed in the United Kingdom.

The present capacity of the Anglo-Persian plant is 2000 tons of crude daily, which will soon be increased to 3000 tons, the daily production of gasoline is 450 tons or 162,058 United States gallons.

The company has 33 tanks now in use on its main tank farm, 25 of which, each of 10,000 tons capacity, are for storage of Persian crude, which is the crude used, and fuel oil.

There are also four 5000-ton tanks for gasoline storage and four of the same size for kerosene. Storage capacity of the farm is 75,000,000 gallons.

WARNS GASOLINE SHIPPERS

R. B. Dunn, chief inspector, Bureau of Explosives, has issued a warning to shippers of gasoline in tank cars not to plug vents in dome covers which are for the purpose of relieving interior pressures. He directs attention to Interstate Commerce Commission regulations against such practices and estimates loss of life attributable to disregard of regulations to have been 80 killed during the past 10 years.

Arkansas R.R. Commission Reduces Petroleum Rates

Tulsa, Okla.—Effective August 1, a reduction in freight rates on petroleum and its products transported within the state has been announced by the Arkansas Railroad Commission. The new Arkansas rates conform to the present Oklahoma intrastate rates.

The reduction between Little Rock and El Dorado is from 27 to 17 cents per hundred and the same reduction applies on shipments between El Dorado and Texarkana. Reductions made also apply to Fort Smith, Arkadelphia, Forrest City, Jonesboro, Newport and Rogers.

When the Shopmen Strike Who Repairs Your Tank Cars?

That is just one of the situations which private owners of tanks cars are seldom capable of meeting.

Lessees of North American cars, on the contrary, look to us to take care of all repairs, and we are equipped to meet this responsibility regardless of emergencies, by reason of our ownership of our own shops, our thorough organization and our long experience. Write us about your needs.

North American Car Co.

327 S. LaSalle St., Chicago

Coffeyville, Kansas 1003 Daniel Bldg., Tulsa Okla.

NEW EQUIPMENT. CATALOGS. BULLETINS. BOOKS

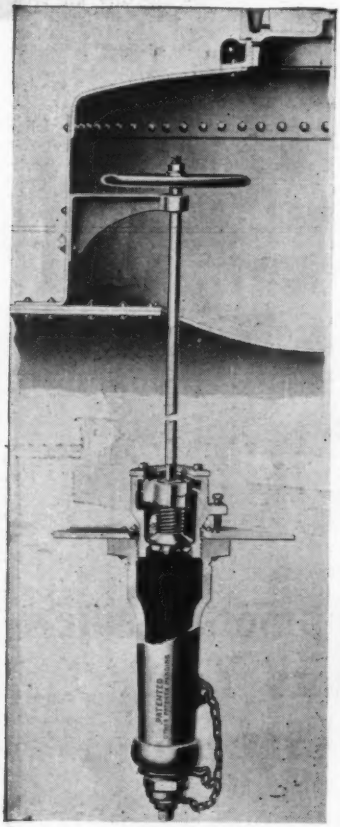


Fig. B

SELF-GRINDING VALVE

To be used where practice has called for the more or less satisfactory A. R. A. standard outlet valve at present used on railroad tank cars, the American Car and Foundry Company has designed two self-grinding outlet valves of a new and improved type.

In replacing the old type with the new it is not necessary to throw away the valve rod or spring, nor to replace the outlet chamber and valve, as this part of the new equipment differs in no way from the old.

To replace the valves the upper part of the valve rod is cut away, also the old valve rod bracket, and the new threaded bracket applied, the cam handle replaced by the new threaded type hand wheel, all of which may be done at small expense.

The principal point to be borne in mind when considering this valve is the peculiar property it possesses of wiping or cleaning the valve seat every time the valve is opened or closed, so that any grit, sand, straw or other foreign matter is dislodged and swept into the outlet chamber.

Figure 1-A shows the valve attached to car, closed.

Positive Self-Locking Valve

It will be noticed that this valve is not only self-cleaning but positively self-locking, and it also embodies all the desirable features for a bottom valve set down in the A. R. A. tank car specifications 1920, page 52.

Figure B illustrates the valve as attached to a car.

These two valves are among the four or five survivors of twenty-five to thirty different designs submitted to the A. R. A. tank car committee for approval, and as far as can be learned, both valves are functioning in a highly satisfactory manner.

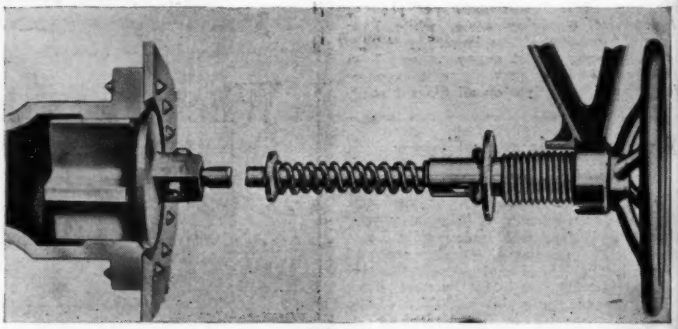


Fig. 1-A

The Sterling oil condensing sections are rapidly supplanting pipe coils for use in refinery condenser boxes on account of their greater condensing efficiency, ability to resist the corrosive action of condenser water on the outside and the action of acids which may be present in the oil vapors, on the inside.

The sections are made of superior cast iron and are of the following dimensions, metal line: ⅜ inch thick, weight 137 pounds, length about 39 inches, width about 16 inches, thickness or depth in stack 4¾ inches, flanged openings all 2½ inches, companion flanges tapped 2½ inches, each section contains 14 square feet, each section is tested to 400 pounds hydrostatic pressure.

Features of the Section

Comparative tests made by users show a condensing rate of about 20 per cent greater with the Sterling section than with pipe coils.

There is no chance for clogging the section with wax oils or other heavy distillate.

The sections are easily installed, and replacements may be made easily and quickly; a section may be replaced with a new one in half an hour.

No danger of pockets being formed as is the case with pipe coils, as the pitch in the sections is sufficient to permit unimpeded flow.

The size of the condenser box required for a given number of square feet of condensing surface will be only one-half as large for the Sterling as for ordinary pipe coils.

No braces or brackets are required for the sections, as they are self-supporting.

Tests were made in an Oklahoma refinery recently, using Sterling condensers, as follows: Temperature readings were made every hour over a period of five days, and it was established that with the vapors entering the condensing sections at approximately 430 deg. F., and the condenser water entering the box at 78 deg. and leaving at 142 deg., the temperature of the condensate at the trap house was 80 to 82 deg.

During the test period the stills were producing 15 barrels per hour through 1700 feet of surface. The sections were assembled 11 in each stack.

In estimating the amount of surface required the factor of 24 B. T. U. per hour per square foot of surface per degree difference in temperature was used, as compared with a much smaller factor where a smooth surface is used.

A recent installation 16 stacks high and used as a spray condenser, developed a rather remarkable condition. The water flowing from the spray pipes and passing over the stacks through which the hot vapors and oil were passing, was cooler at the bottom of the stack than at the top. It appears that in this case there was a forced evaporation.

The cost of installation is very low, being about 60 per cent of the cost of pipe coil installation. Two men in one case installed sections amounting to 1600 sq. ft. of surface, in two days.

Colloidal Amosphous Matter Is Found in Some Paraffin Crudes

By Dr. A. E. Dunstan

Crude oil of the paraffin base type (i. e. oil which on distillation yields solid paraffins in the high boiling fractions) usually contains colloidal amosphous matter which only assumes the crystalline state after distillation. It is probable that the effect of heat in this case is physical, bringing about a change of state whereby the wax is no longer in the dispersed condition characteristic of the original oil. Such oils and their residues after the removal of benzine and kerosene are frequently highly viscous, particularly at low temperatures, owing to the "setting" of the paraffin sol.

The black or dark colored "asphaltic base" oils contain bituminous matter which is to be regarded as being derived from the petroleum hydro-carbons by oxidation (and sulphuration) and condensation. These oils ore optically heterogeneous, although in most cases the degree of dispersion is very high (see Holde, Koll. Zeits., 1908, 3. 270; Schneider and Just, Zeit. f. Wiss. Mikrosk, 1905, 22, 561).

The colloidal asphalts may readily be coagulated by means of strong sulphuric acid (Schultz, Petroleum, 5, 205, 446). The chemistry of the well-known "acid treatment" has been investigated by B. T. Brooks and I. Humphrey (Journal Amer. Chem. Soc., 1918, 40, 822). The usually accepted view that olefines are polymerized to tar and removed as tar is erroneous, for pure olefines (up to the C_{16} member) do not give tars with acid up to 100 per cent strength at 15C. The formation of "acid tar" is probably a dual phenomenon—firstly, the acid coagulates the colloidal matter present in the oil; and, secondly, it brings about polymerization of olefines and diolefines, sulphonation of aromatic derivatives, together with oxidation of primary materials and products.

Pyala (Zeits. Chem. Ind. Koll., 1911, 9. 209) considers that crude oils are sols of which the dispersephases are solid gels such as asphalt, together with liquid particles. When the dispersephase exceeds 60 per cent the phenomenon of gelatinization makes its appearance.

In the discussion on a paper by Glazebrook, Higgins and Pannell (Jour. Inst. Petr. Techn., 1915, 2, 54 et seq.), the writer brought forward the peculiar hysteresis effect in the viscosity of fuel oils and showed that by a suitable alteration in the previous history of a given oil, wide variations in its viscosity may be effected.

The colloidal asphaltic matter in crude oil and the yellow coloring matter in benzine, kerosene and other distillates which is largely caused by "tar-fog" mechanically carried over, may be removed by coagulation (and solution) by agitation with strong sulphuric acid. Direct adsorption on specific surfaces, however, is equally effective.

The writer has shown that fioridin, Fuller's earth, and bauxite which, when freshly ignited, posses powerful adsorptive action, follow the well-known exponential absorption rule: $-Y/m=ac\ 1/n$. For example, using a 0.25 per cent solution of a crude asphaltic base oil in benzine as a test liquid, constant values of n were obtained and the Y/m=c curves were of the usual parabolic type.

The problem of the breaking of persistent emulsions in refining operations is obviously one for treatment by the application of colloid chemistry. The soda wash which is employed to remove the traces of sulphuric acid in refining of lubricating oils is a common source of this trouble, and in some cases a practically permanent emulsion is formed. The sodium salts of naphthenic and sulphonated naphthenic acids are notable emulsifying agents and it is possible that herein lies the cause of what is sometimes a serious difficulty. It is interesting to remember that sodium naphthenates are used very extensively as soap.

A recent patent by Southcombe and Wells brings out the novel point that a small amount (1 per cent) of free fatty acid, added to a mineral lubricating oil, not only replaces the usual blending fatty oil, but according as its molecular weight is low or high, yields a non-emulsifying or an emulsifying oil. It appears that the addition of the free fatty acid appreciably lowers the interfacial tension between the lubricating oil and the bearing. —Jour. Instn. Petr. Techn.

BUREAU OF MINES HAS MAN STUDYING SKIMMING PLANTS

Shreveport, La., Aug. 15.—In the investigation of skimming plant operations being made by M. P. Youker, refinery engineer of the Bureau of Mines, a number of such plants in Louisiana and Arkansas have recently been inspected. It has been found that the largest single factor affecting the overall efficiency of skimming plants is the separation of the gasoline and naphtha from the kerosene. In conducting the efficiency tests at various plants, special attention will be given to fractionating.

OIL REFINERY EQUIPMENT

Crude and Steam Stills Condenser Boxes
Agitators Tanks Towers
Walkways and Stairs

Large Stocks of Materials Prevent Delays
Efficient Shop Service

MASHER
STEEL AND MACHINERY COMPANY
DALLAS, TEXAS

TULSA BOILER AND SHEET IRON WORKS
ENGINEERS-MANUFACTURERS AND ERECTORS
STEEL PLATE CONSTRUCTION
STACKS RIVETED PIPING PRESSURE TANKS ETC.
Box 1926 TULSA, OKLA.

PIONEERS IN MID-CONTINENT FIELD
SPECIALIZING ON CRUDE STILLS
AGITATORS, COND. BOXES
VAPOR TOWERS AND
ALL OTHER REFINERY
TANKAGE

PERSONNEL OF THE INDUSTRY

R. D. BENSON,
President Tidewater Oil Company

E. E. Plumly, manager of the refining division of the Magnolia Petroleum Company, with headquarters at Beaumont, is at present in Ohio visiting relatives. Mr. Plumly, who is accompanied by his family, made the trip by automobile.

F. S. Sullivan, sales manager for the Sunshine State Oil and Refining Company at Wichita Falls, is rejoicing over the arrival of a nine pound boy on July 25. The youngster has been assigned the name of Gerald and is reported to have the makings of another "white hope" of the famous Sullivan type.

C. F. Bevan, formerly with the Pacific Gasoline Company in an engineering capacity, has resigned his position and is now in business for himself. Mr. Bevan will do a general consulting and construction business on natural gasoline plants.

W. B. Hamilton, president of the Texhoma Refining Company at Wichita Falls, Texas, is in California for several weeks' vacation. Mr. Hamilton is accompanied by his family.

Harry K. Davis, well known statistician, has been made head of the statistical department of the Western Petroleum Refiners' Association.

Earl W. Husted, president of the American Refining Company with offices in Great Falls, Montana, announces that his plant will be completed and ready for operations in the near future.

W. H. Cannady, with the Shaffer Oil and Refining Company, was recently elected a director of the Western Petroleum Refiners' Association.

Holman Cook, special investigator for the Gulf Refining Company was back in his headquarters at Wichita Falls again this month after a trip to Shreveport, where he has been on company business for several weeks.

F. E. Hosmer, in charge of the natural gasoline plants of the Gulf Companies in Texas and Louisiana, is spending his vacation by making an automobile trip through Colorado with his family.

George S. Hoagland, of Fort Worth, Texas, who operates a number of refineries in the Central West Texas fields, was in Tulsa early in the month on business.

L. V. Hull, vice president of the Paragon Oil Company, with headquarters at Wichita Falls, was in Toledo, Ohio, during the past month in conference with officials at the company's general offices.

J. J. Taxman, with the Taxman Refining Company of Kansas City, is in New York, where he is spending his vacation this summer.

L. L. Marcell, president of the White Eagle Oil and Refining Company, states that he is planning a trip around the world this fall. Mr. Marcell made a trip through Europe last year.

Underground Travel Didn't Suit Texas Pipe Liner a Little Bit

A bunch of Texas pipe liners made a trip to one of the eastern states to work on a refinery construction job. Among the bunch was Roy Austin; and to those who know him, explanations are not necessary.

When the train arrived in New York, the bunch had two hours in which to see the sights—or as many of them as is possible to see in that short time.

Austin was with the few that elected to go to South Ferry via express subway, and although there were many vacant seats, Roy refused to sit down, and stood on the platform looking from side to side as wild-eyed as a locoed steer.

However, nothing serious happened, and when the party had looked around Battery Park, seen the fish in the Aquarium, etc., they prepared to return to Pennsylvania station, but Roy absolutely refused to return the way he came and suggested walking back. After being told it was about five miles, and pressed for a reason, he said: "If that durned tra'n run off the track down in that sewer it didn't have no place to go."

He looked around in desperation, and finally spied the Sixth Avenue L. He brightened at once, and allowed that there was a train, and while it was a little bit high, a man could see where he was going and didn't have to crawl through a hole like a snake.

The entire gang finally met in the station in plenty of time to catch their train, and it developed that some of the other Texans had in some mysterious manner located two pint bottles of the before-the-war goods, which they saved until the train pulled out, whereupon Roy demanded a drink, and tipping the bottle was pouring the liquid down in large gulps, but at that moment the train entered the tube and the increased air pressure affected Roy's ears. There was hell to pay at once; he quickly handed the bottle to another and yelled: "Take this liquor. The damned Yankees has pizened it!" To the great delight of the others he refused to accept another drink.

REFINERY SUPPLIES

Chemical Market Now Shows Added Strength

Chicago, Ill,. Aug. 12.—The chemical market is providing strictly significant evidence that industrial conditions in this country are fundamentally better. Despite tariff, railroad and labor conditions that would ordinarily injure the sale of industrial chemicals, prices are in most cases holding firm or showing a tendency to strengthen. Domestic demand in particular has shown this welcome stability.

Among chemicals used by refiners the only notable exceptions to the general trend have been silicate of soda, sales of which are nevertheless stated to be in usual volume for this time of year, and caustic soda. Price of silicate of soda has declined about 25 cents per hundredweight. The weakness in caustic soda is due strictly to falling off in export demand, supplies of American caustic soda abroad being at present extensive. This product is selling at $3.45 to $3.75, a decline of approximately 20 cents in the month.

Soda ash is enjoying unusually active demand for this period, and has maintained its recent gains, while soda nitrate, soda chlorate and potash bichromate have shown gains. Sulphuric acid is firm. A rather pronounced advance in the price of acetic acid is attributable in part, no doubt to the general market trend upward, but is partly due to the present higher cost of acetate of lime.

JOBBERS' SUPPLIES

Animal, Fish and Vegetable Oils—Naval Stores

The general price trend in the animal and vegetable oils and naval stores market appears to be upward, though not more than half a dozen products have actually shown a price gain otners remaining merely firm.

Turpentine's recession in price represents merely a return toward a normal basis following its sensational advance the latter part of June, and its price of $1.16 is still a strong price. The rosin market has shown consistent strength, prices continuously advancing up until a few days ago when a slight relapse was suffered.

Linseed and castor oil have advanced in price rather prominently during the month. The several definite advances in castor oil prices have been due to increases in the cost of seed.

OIL JOBBERS' SUPPLIES

Prices based on original packages in large quantities, f. o. b. manufacturing points—unless otherwise specified.

Animal, Fish and Vegetable Oils

(Quotations by Falk Company)

	Prices Aug. 8	
Lard Oils—		
Prime, bbls., lb.		.14½
Extra Winter Strained, bbls., lb.		.11½
Extra, bbls., lb.		.10¾
Extra No. 1, bbls., lb.		.10¼
No. 1, bbls., lb.		.10
No. 2, bbls., lb.		.09½
Tallow, prime edible, lb.	.07¾	.08
Tallow Oil, acidless, bbls., lb.		.10
Lard Stearine, bbls., lb.	.14¼	.14½
Oleo Stearine, bbls., lb.	.09⅜	.09⅝
Neatsfoot Oil—		
Pure, bbls., lb.		.18
Extra, bbls., lb.		.09¾
No. 1, bbls., lb.		.09¼
Horse Oil, bbls., lb.		.05½
Red Oil, distilled, bbls., lb.	.08½	.09
English Degras, bbls., lb.	.04	.04¾
Domestic Degras, bbls., lb.	.04¼	.04¾
Menhaden Fish Oil—		
Light Pressed, bbls., gal.	.54	.55
Yellow Bleached, bbls., gal.	.55	.56
Herring Oil, tanks, coast, gal.	.32	.33
Whale Oil, bleached, bbls., gal.		.75
Sperm Oil, bleached, bbls., gal.	1.62	1.67
Soya Bean Oil, refined, bbls., lb.		.12
Soya Bean Fatty Acids, tanks, West, lb.	.09	.09½
Tallow Fatty Acids, bbls., lb.	.06½	.06¾
Castor Oil—		
No. 1, bbls., lb.		.13
No. 3, bbls., lb.		.12½
Linseed Oil—		
Carloads, bbls., gal.	.86	.88
Less than 5 bbls., gal.	.94	.95

NAVAL STORES

(Quotations by National Rosin Oil & Size Company, Chicago)

Rosins—		
B to I, bbls. (280 lbs.)	5.90	6.35
K to WW, bbls. "	6.35	8.00
Turpentine, spirits, ex yard, gal.		1.16
Rosin Oil, first run, gal.		.39
Rosin Oil, second run, gal.		.41
Rosin Pitch, bbl.		6.00
Tar, kiln burned		9.00
Tar, retort		9.00

REFINERS' SUPPLIES

Prices are based on original packages, in large quantities, and represent spot quotations, unless otherwise stated, f. o. b. manufacturing points.

(Quotations by Wishnick-Trumpeer Chem. Co.)

Soda Ash, light, bags, cwt.	1.75	2.10
Silicate of Soda, 60 deg., tanks, cwt.		1.75
Sal Soda, cwt.	1.20	1.45
Caustic Soda, 76%, drums, cwt.	3.45	3.75
Chlorate of Soda, kegs, lb.		.06¾
Nitrate of Soda, cwt.	2.50	2.55
Potash Permanganate, lb.	.14¾	.15
Potash Bichromate, sacks, lb.	.10	.10½
Sulphuric Acid, 60 deg., tank cars, ton	9.00	11.00
Acetic Acid—		
28%, bbls., lb.	.02¾	.03½
56%, bbls., lb.	.05¼	.06
80%, bbls., lb.	.09¼	.10¼
Fullers Earth, 16-30 mesh, carloads, ton	23.00	25.00
Chloride of Lime, cwt.	1.60	1.90
Benzol, pure water white, gal.		.30
Benzol, 90%, gal.		.27
Toluol, gal.	.30	.35

Executive Headquarters of P. & R. Opened in Chicago

Chicago, Ill.—Executive offices of Producers and Refiners Corporation have been assembled in the Wrigley building here, the entire second floor and a part of the twelfth having been taken over. The Hawkeye Oil Company, distributing subsidiary of P. & R. which has maintained headquarters in Waterloo, Iowa, will occupy one-half of the sixth floor in the Wrigley building.

Frank E. Kistler, chairman of the board of directors of Producers and Refiners, has been located at Denver where the Company still maintains offices and where some of the officials of P. & R. will continue to make their headquarters. W. L. Kistler, president of the Company, has his offices in Tulsa where also are located the general sales offices with A. E. Landsittel, sales manager. Production activities of P. & R. in the Mid Continent also are directed from Tulsa, including the properties of Lyons Petroleum Company, which were recently taken over.

It has been announced here that H. W. Hawkins, former secretary and trust officer of the Standard Trust and Savings Bank, has been elected treasurer of Producers and Refiners, effective August 1.

Wichita Falls, Texas.—The Griswold Oil Company, which has a daily average production amounting to 1500 barrels in the South Electra field, has acquired 40 per cent interest in the Beacon Refining Company's 2000 barrels capacity plant located at Henrietta, about 18 miles southeast of Wichita Falls. The plant is now operating on Griswold Oil Company's production, which is being delivered by The Texas Pipe Line Company. In addition to the Griswold Oil Company, the principal stockowners of the Beacon Refining Company are J. E. Dale, Jos. Edwards, K. N. Hapgood and R. G. Brown.

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REFINERY AND GASOLINE PLANT ACTIVITIES

New Company Operating Atwood Plant at Capacity

Oklahoma City, Okla.—D. B. Richardson, vice president and general manager of the Local Refining Corporation, which concern has leased the Oklahoma City plant of the Atwood Refining Company advises that the refinery is being operated to a capacity of 1000 barrels daily. He states that the demand for refined oils is holding good and that their output is being taken care of among the trade.

Crude for the plant is being shipped to Oklahoma City in tank cars from the Burbank, Maud, Duncan and Lyons pools principally. R. J. Edwards of Oklahoma City is interested in the Local Refining Corporation as is May Mullen, who is secretary, and M. H. Davis, treasurer.

ROESER AND PENDLETON BUILDING ANOTHER PLANT

Wichita Falls, Texas. — Construction work on Roeser and Pendleton Gasoline Company's 9,000,000-cubic foot daily capacity absorption plant located on the J. V. Gardner lease, Section 17, T. P. Ry. Survey, Block 8, Curry-Aetna pool, in Stephens County, is to be completed by the first of September. This plant will have six units, and is being equipped with 165 horse power Rathbun-Jones engines and Ingersoll-Rand Company's duplex compressors. Four units of the plant were completed and placed in operation early this month, and are showing an average recovery of one and one-fourth gallons of gasoline per 1000 cubic feet, according to reports. This plant is the only one in the Curry-Aetna pool, which is located about five miles southwest of Breckenridge. The principal owners are Chas. F. Roeser and T. T. Pendleton, independent oil operators with offices at Breckenridge.

Another Absorption Plant for Burbank

Bartlesville, Okla., Aug. 15.—Construction work has begun on the new natural gasoline plant of the Phillips Petroleum Company in the Burbank pool of the Osage country. When complete, about September 1, the plant will have capacity for 8,000,000 cubic feet of gas daily.

An absorption plant is being built. The low pressure method will be used. Bessemer gas engines and compressors are being installed.

In conjunction with the gasoline plant, a booster station is being built for delivering the residue gas to the mains of the Kay County Gas Company. This station will have capacity of 5,000,000 cubic feet daily.

The two plants will be in the southwest of the southeast of section 26-27-5.

EXPERIMENTAL PLANT ENLARGED

Bartlesville, Okla., Aug. 15.—An addition is being built to the small experimental refinery of the United States Bureau of Mines at Bartlesville, Oklahoma.

Guthrie Plant Sold; To Resume Operation

Tulsa Okla.—The Carbo Oil Company's 1000 barrels daily capacity skimming plant located near Guthrie has been acquired by the Pioneer Petroleum Corporation, and is now being overhauled and placed in first class condition by the new owners to resume operations shortly. According to officials of the Pioneer Corporation the plant will be increased in capacity to 2500 barrels daily. This concern has another plant at El Dorado, Arkansas, and is marketing the refined products manufactured by three other plants. Among the active officers in the corporation are L. C. Harper, James A. Clark and George Irving.

Indiahoma Refining Co. Opens Chicago Office

St. Louis, Mo., Aug. 15.—In order to help them maintain a closer contact with the oil consuming trade in the Chicago district, the Indiahoma Refining Company announces the opening of a branch office at room 1610 Lytton Building, Chicago. The new office will be in charge of G. H. Warner, former manager of the Chicago office of the Pennsylvania-Oklahoma Oil Corporation of Pittsburgh.

Home Petroleum Plant To Be Put in Operation

Oklahoma City, Aug. 15.—After repairs are finished the plant of the Home Petroleum Company here will be put in operation by G. W. Turley, who purchased the property from R. D. Cummings recently. Daily capacity will be around 1000 barrels, part of this coming from production owned by Mr. Turley in the Garber field.

Mr. Turley was once president of the Oklahoma Refining Company, purchased several years ago by the Empire Refineries, Inc.

Capacity of Cyril Plant Increased by Two Stills

Oklahoma City, Okla.—Extensive improvements have been made in the plant of the Cyril Refining Company at Cyril in this State and the refinery's capacity has been increased. Two additional stills have been added and the tank farm which is about two miles from the plant is to be increased to provide for additional crude storage. New gathering lines also are included in the improvement program which is under the supervision of Anderson and Prichard of Oklahoma City.

The refinery is of the skimming type of plant and has been rated as a 500 barrel capacity.

Kansas City, Mo.—The Western Petroleum Refiners' Association announces that it has established a statistical department under the direction of Harry K. Davis.

Small Plant to Be Built at Fredonia, Kans.

Wichita, Kans. — Construction of a small refinery at Fredonia, Kansas, is planned by the Red Bird Oil Company of New York on a ten-acre tract between the Santa Fe and Frisco railroads in the southern part of the town. Work is to commence about the middle of August under present plans of the company. The plant will be built in 200-barrel units.

It is understood that the crude for the refinery, which will specialize on lubricating oils, has been contracted for with the Southwestern Gas Company, which will supply heavy crude from Elk County.

NEW ABSORPTION PLANT TO BE INSTALLED AT BUNGER

Wichita Falls, Texas, Aug. 7.—A natural gasoline manufacturing plant capable of handling 6,000,000 cubic feet of gas daily is to be erected immediately by Fred B. Foster & Company on the G. W. Mahaney farm, located a short distance southeast of the town of Bunger in the Bunger oil field, Young County, Texas. The absorption system is to be installed, and it is planned to have the plant in operation by the first of October. The gas production from the company's deep producer in the southeast corner of the lease, and other wells in the close vicinity, will provide the raw material for the plant. The Foster Company maintains offices in the F. & M. Bank building, Fort Worth, and in Los Angeles, California.

Indiahoma Negotiating for Chickasaw Ardmore Plant

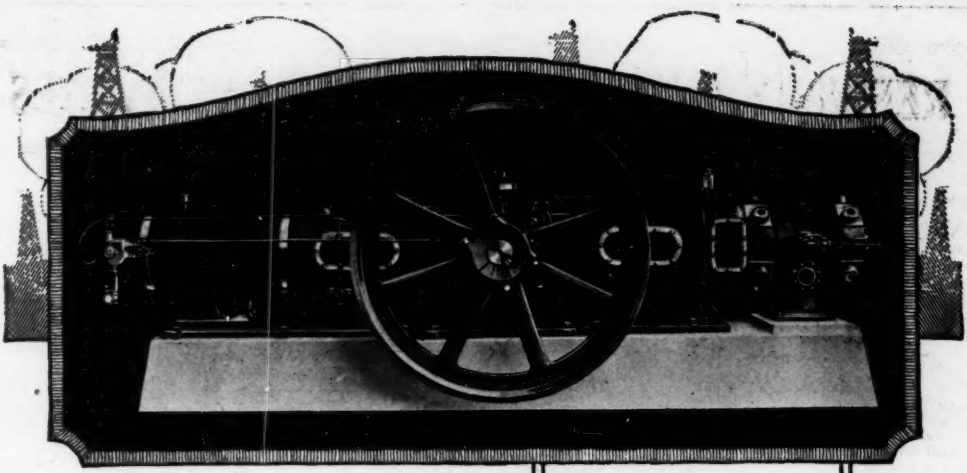
Tulsa, Okla.—It is understood that the Indiahoma Refining Company with headquarters in St. Louis has been negotiating with owners for taking over the Ardmore plant of the Chickasaw Refining Company which has been closed down for some time. In the event the deal goes through it is expected that the plant will be in operation by the middle of September.

The Chickasaw refinery is rated as a 5,000 barrel plant of the skimming type and has been taking Healdton crude until it was closed down on account of unfavorable marketing conditions within the industry.

LEWIS OIL CORPORATION BUYS 1500 BARREL PLANT

Dallas, Texas, August 15.—The Lewis Oil Corporation of this city has acquired the 1500-barrel daily capacity refinery of the Superior Oil and Refining Syndicate located near Comanche, Texas. This plant has been in operation until recently, marketing the greater part of its refined products with the local trade. The new owners have not definitely decided when the plant will resume operation owing to the difficulty to get crude, and tank car movements as result of the railroad strike.

XUM



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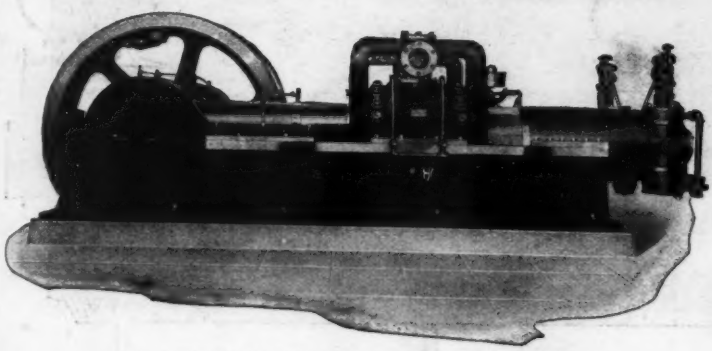

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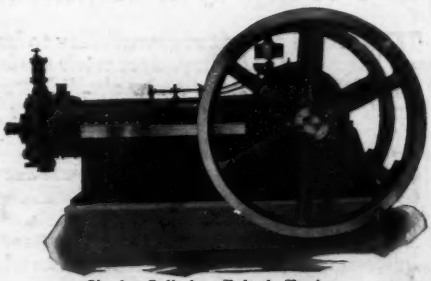

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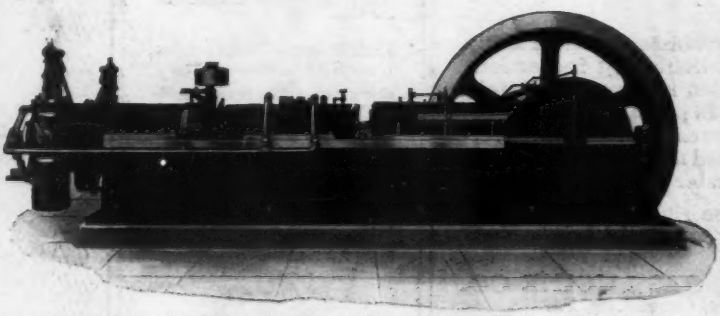

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